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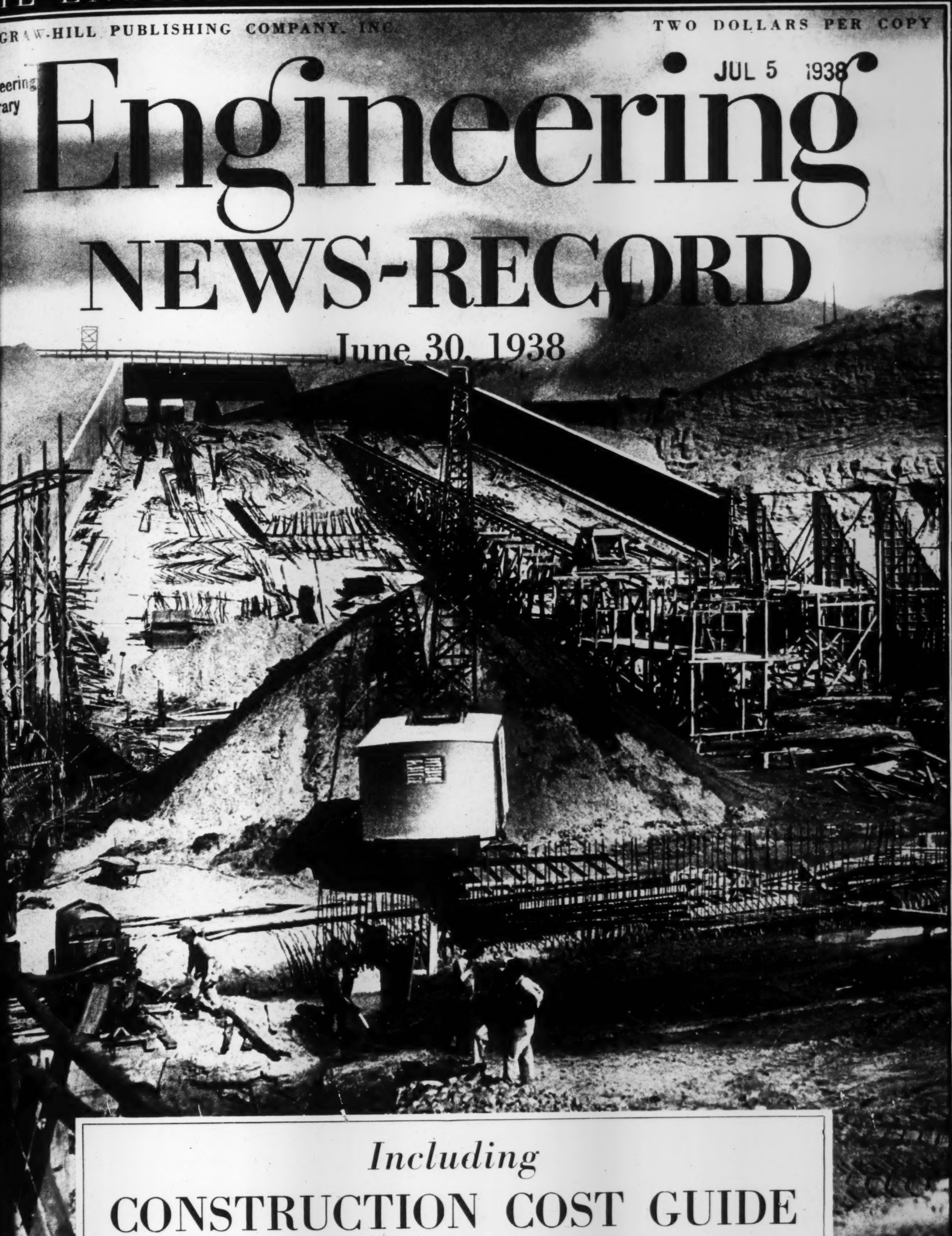
Engineering NEWS-RECORD

June 30, 1938



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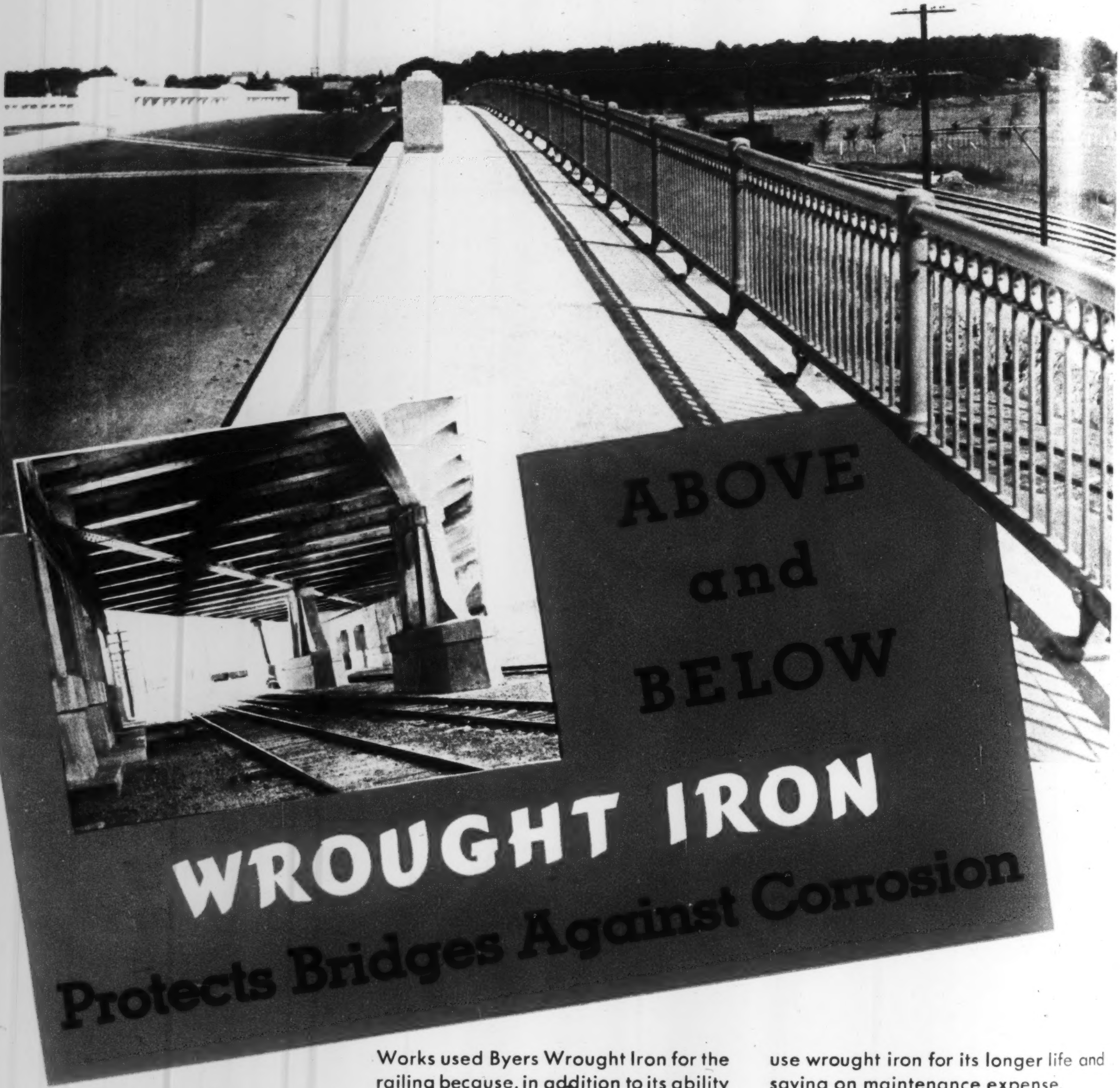

● Bridges over railroad tracks are the continual target of highly corrosive, sulphur-laden locomotive blasts. Because of wrought iron's performance record under these conditions, many railroad and highway engineers have adopted it as a standard material for the parts of these bridges especially exposed to this corrosion and hard to maintain.

On the Newburyport overpass bridge, illustrated, the engineers of the Massachusetts Department of Public Works used Byers Wrought Iron for the railing because, in addition to its ability to resist corrosion, it is easily formed into attractive ornamental designs. Underneath the bridge, Byers Wrought Iron was used for blast plates to protect individual floor beams, and also sidewalk support beams which would otherwise deteriorate under the full sulphur-laden blasts from locomotives, as indicated by the smoke-streaked lines shown in the photograph.

When the bridges you are designing are exposed to smoke, brine drippings, salt-air or salt-water, you should use wrought iron for its longer life and saving on maintenance expense.

You will find many examples of such applications, methods of attaching wrought iron protection plates, and other valuable technical data, in our illustrated booklet, "Wrought Iron in Bridge Construction." Address our nearest Division Office or our Engineering Service Department in Pittsburgh. A. M. Byers Company. Established 1864. Pittsburgh, Boston, New York, Philadelphia, Washington, Chicago, St. Louis, Houston, Seattle, San Francisco.

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ENGINEERING NEWS-RECORD

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Vol. 120 *JUNE 30, 1938* No. 26

THIS WEEK

THE MESSAGE that used to grace the wall of every crossroads store, "If you like our goods tell others, if not, tell us" applies particulary to this issue of *ENR* in which the inclusion of a 75-page Construction Cost Guide, previously published in book form, marks a new departure.

The bid prices for every type of construction work, the data on wage rates, materials and equipment costs, and on compensation rates and the discussions of cost factors have been planned for maximum usefulness to contractors, project planners, estimators and valuation experts.

And so if you don't like it, tell us why. If you do, we could even stand being told that, too.

THE CONCRETE PLANT at Pilot Knob Wasteway on the All-American Canal is notable for the way in which its details have been arranged to take advantage of the peculiar shape of the site. Details are given in the leading article.

How the Cincinnati Gas and Electric Co. sank an 82-ft. circular reinforced concrete caisson to within ½ in. of desired grade and 2 in. from line at a depth of 70 ft. is told on page 897.

To a large city in a dry country, water supply is no small problem. Salt Lake City's proposed participation in the Deer Creek project will bring enough water to provide for its 1980 needs.

Ohio River ferries at Cairo, Ill. which usually must interrupt service in the spring due to high water, are now replaced by a multiple cantilever bridge of 3 main spans, only one of which has a suspended section.

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CONSTRUCTION COST GUIDE

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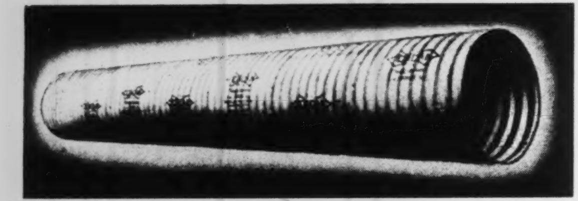
THE COVER PICTURE is a construction scene on Pilot Knob Wasteway, a gate-controlled chute on the All-American Canal through which water can be returned to the Colorado River.

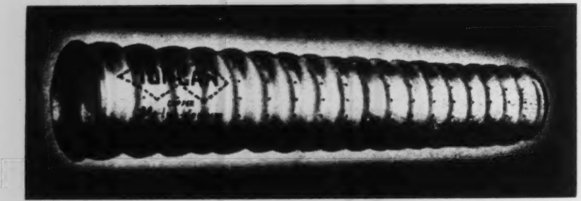
Number of copies of this issue printed: 34,500

TONCAN DRAINAGE PRODUCTS



TONCAN CORRUGATED METAL PIPE

A Standard Drainage Structure for 35 Years. Made of rust-resisting Toncan Copper Molybdenum Iron with 2 oz. zinc coating. • Fabrication complies with standard specifications. • Supplied in diameters from 6 to 84 inches, in any length, in multiples of 2 ft., and in 16 to 8 gauge depending on diameter of pipe. • Complete stock including fittings—connecting bands, tees, ells, crosses—available at various shipping points for immediate delivery.



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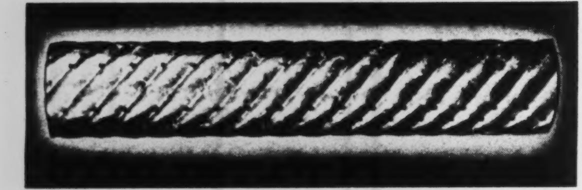
A Drainage Product Which is Quickly and Easily Installed and Assures Efficient Underdrainage with no Maintenance Cost. • Made of same base metal as corrugated pipe and is perforated before galvanizing. • Fabrication complies with standard specifications. • Supplied in diameters from 6 to 30 inches, in any length, in multiples of 2 ft. and in 16 or 14 gauge depending on diameter of pipe. • Complete stock including fittings available from various shipping points.



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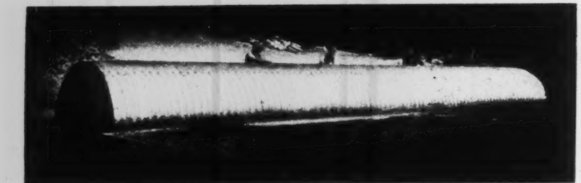
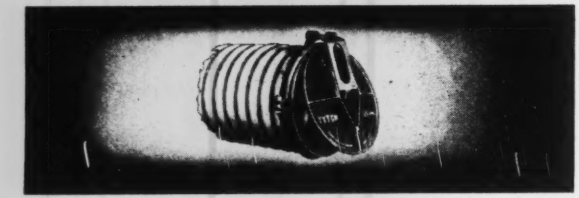
TONCAN SECTIONAL PLATE PIPE

Suitable For Large Drainage Structures. • Same base metal as corrugated pipe. • Corrugations measure 6 inches from crest to crest, 1½ inches in depth. Longitudinal seams in line and circumferencial seams staggered when assembled. • Special bolts furnished. • Diameters of 7½ inch intervals from 60 to 210 inches, in any length in multiples of 2½ ft. • Gauges of 7, 5, 3, 1, or any combination. • Plain, skewed or sloped ends. • Erection plans furnished. • Immediate shipment from Canton, Ohio.



TONCAN SECTIONAL PLATE ARCHES

Provide for Durable and Attractive Small Bridges at Low Cost. • Made of same base metal as sectional plate pipe with same method of fabrication employed. • Available in wide range of spans and rises fabricated to meet field conditions. • Available in any length, in multiples of 2½ ft., in 7, 5, 3 or 1 gauge or in any combination of these gauges. • Plain, skewed or sloped ends. • Complete erection plans furnished. • Immediate delivery from Canton, Ohio.



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A Scientifically Designed Gate which Permits Flow of Water in Only One Direction. • Designed to fit corrugated metal pipe or may be attached to concrete, stone or other types of headwalls. • Available in 8 to 36 inch diameters for immediate shipment from stock and in larger diameters on order.

● Complete information and prices on any of the above products may be obtained from our Toncan representative or by writing directly to us.

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· ENGINEERING NEWS-RECORD ·
JUNE 30, 1938

THE WEEK'S EVENTS

Fire Under Pressure Blocks Queens Tunnel

Mysterious blaze and subsequent flooding cause undetermined damage to vehicle tube

A fire in high-pressure air—most dreaded of all tunneling hazards—broke out in the north Manhattan heading of the Queens Midtown Tunnel under the East River in New York City Sunday night, ultimately causing the collapse of the shield breasting and flooding of the tunnel by the river. No lives were lost, as the blaze started during change of watch shifts and driving operations were suspended over Sunday. The cause, extent or exact location of the fire and the damage from the blow-in of the face are not known. Progress on the heading will be delayed for several weeks.

The twin tubes for the Queens tunnel, 60 ft. apart c. to c., are being driven with four shields, each 31 ft. 8 in. in diameter, two on each side of the river. The Manhattan shields have proggressed about 300 ft. from the bottom of the construction shaft to a point just beyond the shore bulkhead line. Driving on the Manhattan side has been difficult, for the top of the headings lie in porous filled ground reaching down to the springline at the present location; the upper part of the bottom half is in clay and sand; the invert is in rock. Because of the difficult ground conditions, driving is by open-face shields, and the upper half of the face requires timber breasting at all times. The air leakage through the porous fill has been considerable; hay and sawdust are used to reduce the leakage. Air pressure within the headings has been 28 lb. per sq. in.

Fire blocks watchmen

During driving operations the change of shift is made at the face, thus a crew is always on duty 24 hr. a day. However, on Sundays, when the tunnel is shut down from 8 a.m. to 8 a.m. on Monday, the outgoing watch crews often lock out ahead of the incoming crew, the locking operation taking nearly 30 min. When the watch crew going on at 8 p.m. June 26 entered the shaft the outgoing crew had already locked out and left the job, so no contact was made with them. The incoming crew, upon entering the manlock at the foot of the shaft, found the air coming into the lock from the tunnel side full of smoke. The smoke became so thick that locking in was impossible. The crew then went out into the

(*Continued on page* 891)

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Stream Pollution Bill Vetoed by President

Although he "fully approves the establishment of a division of water pollution control in the public health service," the President has withheld his approval from the Barkley-Vinson stream pollution bill which passed near the end of the Congressional session (*ENR*, June 16, 1938, p. 834)

The President objects to the provision that recommendations of the Surgeon-General for authorization by Congress of specific projects to be carried out under the loan and grant provisions of the bill be submitted directly to Congress without any opportunity for review by the chief executive. This, the President said, "provides for the legislative assumption of responsibilities of the executive branch. . . .

"I am convinced that appropriations for projects of this character should be based upon estimates submitted in the annual budget. Only in this way can the merits of such projects be considered in their proper relation to the merits of other projects of a similar nature. . . ."

MAJOR NEWS

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New PWA Program Gets Quick Start

Allotments approved for nearly two thousand projects within three days of signing of bill

Approval of the relief and recovery bill by President Roosevelt on June 21 was the signal for the release by the Public Works Administration of a tremendous stream of allotments to finance both federal and non-federal construction projects in all sections of the country. The great bulk of these allotments went to non-federal projects which had been approved months ago, but for which funds were not available until the enactment of the new recovery program. These were supplemented, however, by grants to various federal agencies and by new projects only submitted while the legislation was under consideration.

As regards the first classification, PWA allotments were announced within three days for a total of 1,776 separate non-federal projects with a total estimated construction cost of $449,815,298, involving grants aggregating $201,285,430 and loans of only $24,282,500.

In conformity with the President's decision to revise the PWA power policy, none of the competitive municipal power plant allotments on the approved list was granted an allotment.

Supplementing the non-federal list are grants to a number of agencies of the federal government for needed improvements, including construction work, surveys, and other activities. These comprise:

Agency	No. of Projects	Allotment
Coast Guard	178	$10,000,000
Navy	123	29,878,000
Veterans' Administration	22	13,268,200
Lighthouse Service .	28	2,098,750
Indian Affairs	68	5,313,000
Geological Survey ..	93	2,690,000
Reclamation Bureau.	15	30,500,000
Dept. of Agriculture	12	2,356,671
Bureau of Fisheries.	78	1,055,350
Coast and Geodetic Survey	34	490,000

Even greater evidence of the anxiety of the Administration to get its pump-priming activity under way was the approval, within three weeks of their submission, of 21 new non-federal projects with an aggregate construction cost of $9,105,459, involving grants of $4,907,457 and no loans.

Office Design Urged For Concrete Forms

S.P.E.E. sponsors Chicago conference on structural practice in steel and concrete

The importance of form work in high-grade concreting and the desirability of designing forms in the office as a part of the main structure rather than in the field were stressed in the sessions devoted to concrete at the conference on structural practice held in Chicago June 20-23 under the sponsorship of the Society for the Promotion of Engineering Education and Armour Institute of Technology.

More than 60 structural engineers and teachers from all sections of the country attended the session, which was devoted in part to technical papers on problems of concrete and steel structures and in part to inspection trips to construction projects and steel fabricating plants.

J. H. Banker of the Portland Cement Association delivered a paper on form construction in which particular attention was given to the detailing of forms for architectural concrete. He recommended that design drawings show the pour lines and also specify the type of form material, since this determines the texture of the finished surface. The extra cost of good forms may be offset by the savings in finishing and by the improved appearance of the structure.

Practice and theory

In a paper on "Design Practice as Contrasted with Theory", T. F. Collier, also of the Portland Cement Association, emphasized points which the designer should consider in order to facilitate field work and to produce the most economical structure. The cost of form work should be taken into account, and effort should be made to reduce the number of different beam and column sizes, and these should be dimensioned so that standard lumber widths may be utilized.

Forms for architectural concrete are best designed in the office and should not be left to the field crews. According to Collier, this opens up a new and important function for the structural engineer. He also advocated the practice of having reinforcing steel detailed by a structural engineer rather than by the bar company.

The subject of functional design in steel was treated by Henry Penn, district engineer of the American Institute of Steel Construction. He recommended that civil engineering students be given more training in functional design to stimulate their imagination and to develop planning ability. The designer must learn to choose the best structural framing for a given purpose from the many types available, and in making the selection he should consider the economics of the project as a whole. The appearance of a structure is of prime importance, said Penn, and the structural engineer can develop the artistic sense which is necessary for producing attractive designs.

Large building design

V. O. McClurg, Chief Structural Engineer for Holabird and Root, architects, explained the procedure of planning large buildings in an architect's office. He pointed out that a modern building is so complicated that no one individual could acquire enough knowledge in a lifetime to answer all the questions arising on a single project.

C. S. Rowe, engineer of bridge construction, Chicago engineer's office, presented a history of Chicago's bridges and discussed the many difficult problems which arose in their design and construction.

Representatives of the American Bridge Company and of the Chicago Bridge and Iron Company explained their methods of estimating, detailing, fabricating, and erecting steel structures. An inspection trip was made to the fabricating plants and drafting rooms of both of these two companies.

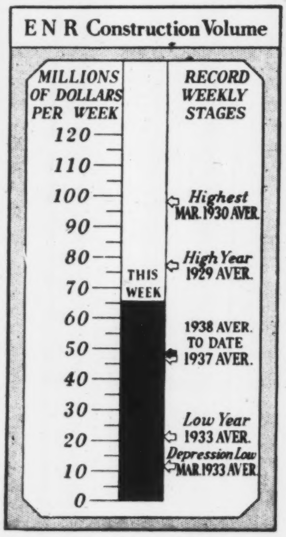
CONTRACTS AND CAPITAL

ENGINEERING construction awards for the week $67,620,000, are 102 per cent above the preceding week, and 22 per cent above the corresponding week in 1937. This week's awards bring the total for 1938 to date to $1,254,931,000, 3.5 per cent below the volume for the 26 week period in 1937.

Public construction is 161 per cent above the previous week, and 76 per cent above last year. These gains are due to the high volume of highway construction present this week. Private awards are 13 per cent below the preceding week, and 56 per cent below the week a year ago.

The $25,000,000 highway volume is the highest reported by *ENR* in the past five years. Twelve large street improvement and highway projects in 8 states are responsible for more than half of this record total. The $10,000,000 contract for Pensacola Dam in Oklahoma boosts earthwork and drainage to its second highest 1938 volume.

New capital for construction purposes for the week, $281,453,000, is the largest weekly total reported this year, and is more than ten times that reported for the corresponding 1937 week. PWA allotments for state and municipal projects, $225,573,000, and for federal projects, $49,053,000, are responsible for the large gain. New capital for 1938 to date totals $1,069,452,000, a 71 per cent increase over the volume for the corresponding period a year ago.



CONTRACTS

(Thousands of dollars)

	Week Ending July 1 1937	Week Ending June 23 1938	Week Ending June 30 1938
Federal	$9,127	$3,672	$10,061
State & Municipal	23,579	18,426	47,526
Total public...	$32,706	$22,098	$57,587
Total private...	22,772	11,474	10,033
TOTALS	$55,478	$33,572	$67,620

Cumulative
1938 (26 weeks).......$1,254,931
1937 (26 weeks).......$1,300,906

Note: Minimum size projects included are: Waterworks and waterways projects, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1937 26 Wk.	Cumulative 1938 26 Wk.
NON-FEDERAL	$624,914	$933,867
State & Mun. bonds...	274,368	347,959
Corporate securities...	278,292	181,938
PWA loans, grants....	42,315	227,609
RFC loans.............	29,939	65,291
U.S.H.A. loans.........	......	111,070
FEDERAL	......	$135,585
TOTAL CAPITAL....	$624,914	$1,069,452

FHA MORTGAGES

	Cumulative 1937 25 Wk.	Cumulative 1938 25 Wk.
Mortg. selected for appraisal	$320,384	$442,089

ENR INDEX NUMBERS

Index Base	1913	1926
Construction Cost (June)...	236.86	113.86
Building Cost (June)......	198.22	107.15
Construction Volume (May)	167.00	73.00

City Financed Housing Planned for New York

Tax on rented business premises would secure housing authority bonds for additional work

A measure by which the New York City Housing Authority would issue about $20,000,000 in bonds for housing construction, and the bonds would be secured by receipts from a tax on rented business properties, has been passed by the Council and Board of Estimate of the city and is now awaiting the mayor's signature.

The plan closely follows that proposed last February by the American Labor Party (*ENR*, Feb. 3, 1938, p. 165).

The present measure would put into effect a city occupancy tax on rented business property. The tax would be $6 a year on property paying an annual rental of $5,000 or more, and for property with a lower rental the tax would range down to $1 per year. The proceeds from the tax are estimated at $600,000. This sum would guarantee nearly $20,000,000 of housing authority bonds at 3 per cent. Since these securities are exempt from federal and state taxation, it is believed that this rate could be secured.

The bond issue would be used for a housing program to be carried out by the City Housing Authority which would supplement the program the authority is initiating in cooperation with the federal government.

• • •

Fire Under Pressure Blocks Queens Tunnel

(*Continued from page 889*)

shaft and tried to enter the tunnel through the muck lock, which is placed at a lower elevation. The men managed to get through this lock, but were unable to advance into the tunnel because of smoke and heat.

Tunnel and contractor officials were called and a fire alarm was turned in. Firemen and the contractor's superintendent tried to enter the tunnel with gas masks, but were unable to get very far from the lock. Air pressure was reduced to 25 lb. to lessen the draft through the leaking ground and yet hold the heading. By 4 a.m. Monday it was apparent the only method of checking the fire would be flooding.

Both the contractor's emergency pumps and pumps on the fire apparatus were hooked up to pipelines running through the locks, working against the air pressure. It was planned to flood the heading, which inclines downward, up to the springline at the face, thereby submerging most of the combustible material in the heading. This procedure was followed for a few hours, but at 9 a.m. the face suddenly blew out, letting in the river water and completely filling the heading.

The shield had about 40 ft. of cover underlying 10 ft. of water. Combustible material in the tunnel consisted of a few bales of hay, several bags of sawdust, timber working platforms and flying gangway, and timber for the breasting. Hay and other highly-combustible material has been known to ignite from spontaneous combustion under compressed air, and even damp, heavy timbers will burn fiercely. There were two electrical lines in the heading, one 220-volt line for power and a 110-volt light line.

Recovery operations will be to first dump a heavy blanket of clay over the disturbed river bottom, letting it consolidate for two or three days. Then the air pressure will be restored to the heading, forcing the water out through blow lines. Operations on the adjacent south tube are proceeding cautiously until the extent of river bed disturbance is determined.

The tunnel is being driven by the Walsh Construction Co., under the direction of J. A. MacDonald, for the New York Tunnel Authority.

• • •

City Tenement Repairs Held Constitutional

A New York state law permitting the State of New York to make repairs to old-law tenements which are in dangerous or unhealthy condition, without the consent of the owner, and to tax the property for the cost of the repairs, was held to be a constitutional exercise of the state's taxing power by the Appellate Division, June 24. Constitutionality of the law had been attacked by three savings banks which hold mortgages on tenement property.

The court drew attention to a report of the New York City Housing Authority which showed that the death rate from all causes was 92 per cent higher in old-law tenements and said that "while the provisions of the act may work a hardship on some property owners . . . we must look to the best interest of the citizenry of the state rather than the individual."

The principal contention of the banks was that the bill illegally voided their contractual rights, by setting up a tax lien taking precedence over their first mortgages. On this, the court said that "little if any heed need be given [to this contention] . . . the fact of the matter is that the mortgagee will benefit in the long run by having the property . . . improved."

Housing Law Upheld In North Carolina

Legality of state housing authority is upheld by North Carolina supreme court

In a sweeping decision, the constitutionality on all points of the North Carolina state housing law was upheld by the North Carolina supreme court in a decision handed down in a test case brought by a taxpayer.

The Alabama supreme court recently upheld the Alabama housing act, and test cases are now pending in Pennsylvania, Indiana, Louisiana, South Carolina, Georgia and Florida.

In its opinion, the court held that slum clearance and construction of low rent housing projects are public purposes in which a local housing authority may legally engage. It also held that a local authority has the right to exercise the power of eminent domain in condemning property for low cost housing.

Outside debt limit

Revenue bonds issued by a local housing authority, the court held, are not debts or obligations of the municipality within the meaning of the constitutional provision setting limitations on municipal debts. The housing authority, however, is a municipal corporation within the meaning of the North Carolina constitution, and as such its property is exempt from all state, county and local taxes.

A city, it was held, may lawfully convey real estate to a local housing authority with or without consideration. The benefits received by the municipality from a housing program were held to be a sufficient consideration to support a conveyance of real estate.

The court specifically held that a housing authority is not an administrative agency of the city but is a separate and distinct municipal corporation.

• • •

Canada May Drop Sales Tax On Building Material

The budget submitted by the Finance Ministry to the Canadian Parliament on June 16 includes a provision to exempt from the 8 per cent federal sales tax materials used in housing construction. The proposal must be ratified by Parliament, but speakers of all parties have expressed approval of the idea so that ratification appears most likely.

The proposal incorporates a list of 40 major items of materials which would be exempted.

Annual Awards Made For Steel Bridges

Golden Gate, Marine Parkway, Little Hell Gate, Chesterfield-Brattleboro bridges are winners

For the tenth successive year, the American Institute of Steel Construction has selected the most beautiful bridges built during the previous twelve months and awarded stainless steel plaques to be attached to the structures to commemorate the event. Four classes of bridges are covered: Class A, over $1,000,000; Class B, $250,000 to $1,000,000; Class C, under $250,000; and movable bridges. The 1937 jury of award, all of New York City, consisted of H. E. Wessman, professor of structural engineering, New York University; William H. Yates, consulting engineer; William Lescaze, architect; L. Andrew Reinhard, architect, and Kenneth Reid, editor, *Pencil Points.*

The winners are: The Golden Gate Bridge, Class A, Joseph B. Strauss, chief engineer; O. H. Ammann, L. S. Moisseiff, and Charles Derleth, Jr., consulting engineers; and Bethlehem Steel Co., fabricator. Marine Parkway lift bridge, New York City, Madigan-Hyland, supervising engineers; Waddell & Hardesty, consulting engineers on lift and through spans, and Robinson & Steinman, consulting engineers on deck spans; Aymar Embury II, architect; American Bridge Co., fabricator. Little Hell Gate crossing of Triborough Bridge, New York City; O. H. Ammann, chief engineer; Allston Dana, engineer of design; Aymar Embury II, architect; American Bridge Co., fabricator. Chesterfield-Brattleboro bridge over Connecticut River; New Hampshire state highway department, John W. Childs, bridge engineer; Harold H. Langley, designing engineer; Bethlehem Steel Co., fabricator.

• • •

President Vetoes Bill To Halt Bid-Shopping

A bill which would have required contractors on public building projects to name in their bids the subcontractors and material and supply men with whom they proposed to deal has been vetoed by President Roosevelt. The bill, which would have applied to all contracts of more than $5,000, provided for assessment of penalties against contractors who failed to use the subcontractors and supply men named in their bids, unless it could be shown that these were unable or unwilling to fulfill their duties. The bill also provided penalties for failure to pay amounts due to subcontractors and suppliers.

In his message of disapproval, the President stated that he realized the evils of bid shopping, but that he does not think the practice will be prevented by the bill. He does feel, however, that the provisions of the bill would seriously hamper the public works program. It would make mandatory, he said, a period of 60 days between advertisements and openings of bids, and its provisions might necessitate the re-advertisement of many projects. "I do not feel," he said, "that the objects of the bill are of sufficient importance to justify the retarding of these programs. . . ."

OBITUARY

ARCHIE BOYTE, Greenville, Miss., civil engineer, died recently at Oteen, N. C. In addition to engaging in private practice, Boyte had been connected with the U. S. Engineers and the Greenville Levee Board.

GEORGE F. CONANT, a civil engineer who practiced for many years in the South and in New England, died in Cambridge, Mass., June 20 at the age of 86. After graduation from Appleton Academy, he served on the engineering staff of Cambridge and Somerville, Mass., and of the Massachusetts Central R. R. Later he became city engineer of New Decatur, Ala., and engineer of construction at the Columbia, Tenn. arsenal. Conant served for several years as an engineer in the Portsmouth Navy Yard, was chief engineer of the Kentwood and Eastern R. R. and was water supply engineer for the city of Kentwood, La. During the war he was engaged in construction for the Ordnance Department. Conant retired about 18 years ago.

JACKSON P. GRASON, 50, highway engineer for Baltimore county, Md., died on June 2. Grason was a graduate of the University of Maryland School of Engineering.

L. S. VOLIGNY, formerly chief engineer of the International Waterways Commission and long active in dominion engineering work in western Canada and Quebec, died June 17 at the age of 75.

GEORGE R. BOYCE, vice president of the A. M. Castle Co., formerly city engineer of Indianapolis, and engineer on the construction of the California waterworks in Cincinnati, died in Chicago June 14 at the age of 70. Boyce practiced for many years in partnership with his father in railway and street paving work.

Waterway and Flood Projects Approved

President signs War Department civil appropriation bill and some projects are released

President Roosevelt on June 14 approved the War Department's civil appropriation bill which carries funds for the fiscal year ending June 30, 1939 for navigation and flood control projects to be carried out by the Corps of Engineers.

The bill appropriates $70,020,000 for new and maintenance work on rivers and harbors. In addition, $18,000,000 is provided from relief funds and an unexpended balance of $24,000,000 is reappropriated.

For flood control, the act provides $82,000,000 plus $31,000,000 for flood control on the Mississippi River and tributaries.

Allotments made

Shortly thereafter, allotments of funds to specific projects were made which totaled $62,389,600 for new work on river and harbor projects and $28,983,000 for river and harbor maintenance work. Flood control projects approved totaled $60,747,000. Outstanding among the projects approved by the president and to be carried out immediately are the following:

Flood control projects

Southern N. Y. Projects (Binghamton Area)	$5,950,000
Wilkes-Barre & Hanover Twp., Susquehanna River, Pa.	2,065,500
Kingston-Edwardsville, Susquehanna River, Pa.	1,204,500
For protection of Pittsburgh	
Tionesta Reservoir, Pa.	1,440,000
Crooked Creek Reservoir, Pa.	1,350,000
Johnstown, Pa., Channel	1,800,000
Mahoning Creek Reservoir, Pa.	1,350,000
Ohio River Basin	
Huntington, W. Va.	2,434,000
Ceredo, W. Va.	1,114,000
Kenova, W. Va.	1,707,000
Ironton, Ohio	1,280,000
Los Angeles Co. Drainage Area	
Hansen Retarding Dam	3,000,000
Los Angeles River, Mariposa to Downey Rd., Calif.	7,825,000
Prado Dam, Santa Ana River, Calif.	2,125,000

River and harbor projects

Black Warrior, Warrior and Tombigbee Rivers, Ala.	1,500,625
Mississippi River between the Missouri River and Minneapolis	6,557,000
Missouri River: at Fort Peck	10,631,000
Kanawha River, W. Va.	1,277,540
Columbia River at Bonneville	2,900,000
Cape Cod Canal, Mass.	1,600,000
Great Lakes to Hudson River waterway, N. Y.	4,250,000
Missouri River, Kansas City to Sioux City	3,354,000
Inland waterway, Cape Fear River, N. C., to Winyah Bay, S. C.	1,141,300
Calcasieu River and Pass, La.	1,000,000
Detroit River, Mich.	1,000,000
Sacramento River, Calif., debris restraining dams	1,000,000

Industrial Building Drops 70 Per Cent

Industrial building for first half year drops to 1935 level, less than third of 1937 figure

Awards of industrial building contracts for the first 25 weeks of 1938 are $88,214,000, a drop of 70 per cent from the total in this classification for the corresponding period of 1937. This total represents a drop of 28 per cent below the first 25 weeks of 1936, and is about equal to the 1935 volume for the corresponding period. Last year was the second largest industrial building year on record, being surpassed only by the $547,313,000 all-time high volume of 1929.

In 1929, public utilities and power plants contributed the largest volume of any single group, $151,033,000, 28 per cent of the national total of all types of industry; in 1937, only 15 per cent. The depression low for this group is 1934 when it represented 2 per cent.

The steel mill building program contributed the largest year's total to the 1937 record volume, $111,426,000 or 23 per cent, but chemical manufacturing or process industry was a close second with $111,246,000. In 1929 the former represented 9 per cent and the latter 22 per cent of productive plant expansion. The process industry has made the steadiest contribution to new plant construction, ranging only from a high of 28 per cent of the national total for all types of industry to a low of 20 per cent in 1934 and 1935.

The food industry on the other hand increased its proportion of the national industrial building total from 6 per cent in 1929 and 1930 to 33 per cent in 1933 and 20 per cent in 1934. The high food industry subtotal in 1933 and the carry over into 1934 are due in large measure to the brewery building that accompanied relegalizing beer.

CALENDAR OF MEETINGS

NATIONAL SOCIETIES

American Society of Civil Engineers, annual convention, Hotel Utah, Salt Lake City, July 20-22.

American Institute of Electrical Engineers, Pacific Coast convention, Portland, Aug. 9-12.

LOCAL AND REGIONAL

Western Association of State Highway Officials, annual convention, Reno, Nev., Aug. 10–13.

American Water Works Association, Central States Section, Hotel Windsor, Wheeling, W. Va., Aug. 17-19.

• • •

RFC Will Help Knoxville Buy Power Company

Negotiations have been completed for financing by the Reconstruction Finance Corporation of the city of Knoxville's share in the purchase of facilities of the Tennessee Public Service Co. Tentative plans, subject to minor changes, provide that RFC will purchase serial bonds to the amount of $5,800,000, to be secured by revenues from the property and to be amortized over a period of twenty years.

The sale of the electrical facilities of the Tennessee Public Service Co. to the city of Knoxville, the Tennessee Valley Authority, and the Appalachian Electric Power Co., is to be considered by the Federal Power Commission at a hearing which it has called in Washington for July 11. A contract entered into on June 14 provides for sale to the city of electric properties in the Knoxville area and to the TVA of facilities outside that area, the city paying $5,483,000 and TVA $2,551,000. The property to be sold to Appalachian is a 110-kilovolt transmission line.

WASHINGTON HIGHLIGHTS

Special reports by Paul Wooton

Construction materials aggregating about $12,000,000 in value will be purchased in the near future for projects under the WPA. The buying will be done through the state offices of the Treasury Procurement Division, and will include 2,050,000 bbl. of portland cement, 1,325,000 tons of sand, 1,425,000 tons of gravel, 2,270,000 tons of crushed stone, and 210,000 tons of paving asphalt. Bids will be opened June 29 and deliveries will be spread over the next six months.

Because of the scattered nature of the work the cement purchases are being exempted from the new plan for centralized purchasing of this material.

A clerical error during the legislative rush attending the adjournment of Congress prevented the appropriation of an additional $100,000 for the TVA investigating committee. It had been intended to add this amount to the second deficiency bill by a Senate amendment, but this was not done. Handicapped by the slip-up, which leaves only $50,000 for the investigation, the committee has decided to economize by drafting experts from various branches of the government. Committee members anticipate no difficulty in obtaining more money when Congress reconvenes.

An immediate start on the installation of generating equipment at the Fort Peck dam in Montana is assured by the allotment of $1,700,000 for this purpose from general river and harbor funds by the Secretary of War. (See page 891.)

CONTRACTS FOR INDUSTRIAL BUILDING CONSTRUCTION BY INDUSTRIES
(Value in Thousands of Dollars *ENR* Reports)

	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935		1936		1937		1938†	
										No.	Value	No.	Value	No.	Value	No.	Value
Transportation Service																	
1. **Railroads**							$1,108	$3,621	$909	14	$712	22	$1,690	31	$2,417	4	$571
2. **Automotive**	$29,029	$23,022	$37,181	$28,962	$18,090	$10,479	9,562	10,288	5,655	114	4,173	99	5,127	152	8,431	48	2,420
Public Utilities & Other Power Plants	91,621	43,860	64,273	151,033	86,137	40,813	22,800	14,290	1,741	21	7,577	58	42,481	109	70,765	40	26,788
Process Industries (a)	38,499	67,415	82,591	122,648	52,741	24,679	19,002	43,203	21,922	208	34,655	337	81,627	393	111,246	85	24,325
Food Industries (b)	22,070	30,827	32,957	32,138	21,289	14,311	14,385	50,038	20,674	329	19,655	366	28,639	389	36,535	127	9,779
Metal Refining & Rolling	6,130	26,847	19,014	48,920	34,083	3,515	745	6,979	31,609	43	59,075	45	65,505	35	111,426	2	2,840
Metal Working Plants																	
1. **Auto Factories***					6,380	3,120	3,735	331	1,709	14	3,553	24	17,410	19	21,763	1	2,600
2. **Aircraft Factories**		211	4,361	14,818	2,230	75	418	128	30	2	425	7	915	3	4,312	2	150
3. **Foundries**	3,442	2,852	4,752	4,150	2,146	1,686	188	465	368	32	1,952	26	1,541	35	1,890	5	195
4. **Machines & Machined Parts (c)**	65,132	6,985	11,503	17,044	6,374	6,639	5,220	2,848	3,404	123	11,079	219	14,560	287	41,030	44	4,765
Textiles (excl. rayon)	13,280	46,134	9,103	9,705	3,300	2,427	2,047	2,781	1,431	58	2,216	57	2,421	69	5,017	19	1,053
Wood Industries	7,564	3,204	2,652	4,857	1,400	726	595	2,296	488	24	999	19	1,008	13	825	6	360
Miscellaneous General Factories (d)	45,150	69,958	86,800	113,638	97,001	57,280	13,259	15,108	15,252	447	26,396	635	45,553	816	61,641	191	12,367
Total	$321,967	$321,315	$355,187	$547,313	$331,171	$165,750	$93,064	$152,376	$105,192	1,429	$172,467	1,914	$309,477	2,351	$477,298	574	$88,214

* Auto factories for years *1926, 1927, 1928 and 1929 are included under "Automotive"—Transportation Service* † *25 weeks.*
(a) *Includes Distilleries.*
(b) *Includes Breweries and Wineries.*
(c) *Includes Radio Plants.*
(d) *Includes Refrigeration and Cold Storage Plants*

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JUNE 30, 1938

MOST DREADED OF DANGERS attendant upon the use of high-pressure air, fires in compressed-air working are fortunately rare. But the fire that has just visited one of the four headings of the East River vehicle tunnel at New York is a new illustration of their unaccountability and therefore lays impressive emphasis on the importance of applying every safety precaution possible. The Queens tunnel has all the advantage of thorough experience and competence on the part of directing management as well as contractor and working forces. Further, it was equipped with every means of protection against fire that experience or forethought suggested, including fire lines carried close up to the heading at all times. Yet the safeguards were not sufficient to prevent the start of a fire last Sunday or to control it from destructive spread. While none connected with the work are able to say where or how the fire originated, and the subsequent blowout of the face—probably because of collapse of the face timbering—makes the recovery of definite information on the antecedent conditions questionable, it is to be hoped that when the tunnel is again cleared enough can be learned to help toward more complete future protection.

Dustless Drilling

THE CONVICTION of a contractor for failing to use dust-control methods in rock drilling shows that New York state is now ready to crack down on violators of its silicosis act. Enforcement of the act, passed two years ago, has proceeded slowly and cautiously. The state authorities have spent much time and care in formulating workable rules of procedure, meanwhile overlooking even flagrant violations. Vacuum-hood devices, regarded as particularly suitable for open rock work, were tested and approved and are working satisfactorily. Later a code for wet drilling coupled with adequate ventilation was formulated, and individual makes of drills are being tested for approval. This code satisfies the majority of tunnel contractors, for it requires but little change from customary tunneling procedure. A minor change is necessary in some types of drills to decrease the air and increase the amount of water through the drill steel and to prevent blowing out by air alone; additional and better-controlled ventilation will also be required. Successful solution of the drill-dust problem at the start of building the Delaware River aqueduct means that the world's longest tunnel will be the safest ever driven in protection from dust hazards.

A City Tackles Housing

LAST WEEK the New York City Council passed a bill that may become historic, marking as it does the first time that any American city has embraced public subsidized housing without benefit of federal pushing and financing. A tax is laid on all rented business properties to provide funds for guarantee of interest on bonds of the New York City Housing Authority, bonds whose sale will furnish funds for large-scale slum-clearance housing. Estimates place the tax proceeds at $600,000, or enough to service $20,000,000 of 3 per cent bonds. The curious reasoning which placed the tax subsidy burden on the business renter would seem to require some explanation. For the time being, however, it is enough to point out that New York City has decided to assume local responsibility for better tenement conditions. As a more logical approach to the problem than reliance on the federal government, it warrants commendation and study.

Engineers as Experts

ENGINEERS LOOK upon engineering as an exact science, one in which two men given the same set of facts to be analyzed should arrive at the same or similar conclusions. But on many occasions two experts on opposite sides of an argument arrive at very diverse conclusions from the same facts. Not infrequently the results cause ordinary laymen to question whether engineers really are the impartial experts that they profess to be. A recent example is found in current negotiations for sale of the Sixth Avenue elevated railway in New York City to the city. One engineer valued property easements at something over $4,000,000, the price that the railway originally paid for them, but another placed their value at over $36,000,000, basing his estimate not on what the easement cost but on the present value of property along the line, including increments in the value of 28 per cent of the property on which the railway had obtained easements for nothing. Such carrying of valuation theories to absurd extremes tends to lower public esteem for the whole engineering profession.

To Eliminate Pier Scour

ONCE AGAIN foundation scour has led to the destruction of a bridge that was believed to be safe and adequate even for the exacting service of high-speed railroad trains. The wrecking of the Milwaukee's Olympian, with the greatest loss of life in any railroad accident since 1923, places tragic emphasis on this paramount foundation hazard. No suggestion has been made that the pier footings of the Custer Creek bridge were shallower than good design practice would have allowed; indeed, a quarter century of service had revealed no indication of dangerous scour. But unless the reports to date are quite misleading scour did occur, and the question of adequate bridge pier design is thus thrown squarely into the laps of engineers. A revaluation of the economics of providing deeper or more substantial piers in streams subject to high velocity flash floods is clearly in order. Perhaps a second line of defense, such as anchor piles under the footings, is worth consideration. Perhaps sheetpile cutoffs around and below all spread footings are a necessary added precaution. Since high-speed train operation places new premiums on safety, the cost of protection must be put in second place to safety. Pier scour is no more of a hazard today than it ever was, but we may be justified in spending more to prevent it than used to be the case.

A Voice for Engineers

BRITISH ENGINEERS have launched a new professional society with its chief purpose that of coordinating the thinking of engineers so that they may have a more concerted and useful voice in public affairs. The step is a new one for British engineers, but in this country a similar movement was started nearly 20 years ago when American Engineering Council was set up. Now we have two such organizations, American Engineering Council and the National Society of Professional Engineers. In view of the British movement it may be well to attempt to appraise what we have accomplished in two decades.

Frankness calls for the admission that the system of representation set up in American Engineering Council has not been above criticism. Early in its career, Engineering Council let itself become so closely associated with the Hoover Administration as to create the impression that it was an agency of a political party rather than of the engineering profession. Further, officers of the council took it upon themselves to make public pronouncements of their personal views on questions concerning which the council had taken no official action. But these are matters of personal error rather than indications of defective system.

On the other hand, experience with A.E.C. raises question as to whether engineers can ever be expected to speak with one voice on major issues. Take as example the first public works program in 1933. The civil engineering group, of which engineers in public service make up a large part, was in favor of the program, but the electrical and mechanical groups, expressing the outlook of the large corporations, were opposed to it. As a result conflict developed within Engineering Council and it could not speak with unanimous voice. Much the same situation may be expected to develop on other national issues; economic or political questions stand out of such issues as more important than the purely engineering questions involved, and on those questions engineers step out of their professional role and become ordinary citizens who hold diverse, though equally justifiable, opinions on such matters.

Under these circumstances is it not time to reconsider the present costly system of bringing society representatives to Washington to attempt to formulate engineering opinion on national questions?

Reconsideration also is called for by developments growing out of the recent establishment of headquarters of the National Society of Professional Engineers in Washington with a national secretary through whom the society already has begun to express itself on national matters. As the N.S.P.E. is not a member of the assembly of American Engineering Council many engineers find themselves participating in the financing of two agencies in Washington, each professing to represent them and yet capable of expressing diametrically opposite opinions.

Few will question the need for an ear and an eye for engineers in Washington to keep them informed of national developments of importance to them. But experience to date gives good reason to question the advisability of attempting to maintain a voice that can speak with any unanimity. National legislation seldom if ever affects all engineers as directly as does state legislation, hence there is not the same need for maintaining facilities for quick and concerted action as there is on local legislation. On national issues an ably staffed listening post in Washington could keep the diverse engineering groups advised of developments of interest to them. With this information before them the several groups could decide on what action is needed to protect their special interests, and if any issue is sufficiently important they can send their own spokesmen to Washington to plead their cause. This will be opposed by some as destructive of engineering unity; but if engineers cannot speak as a unit, as history indicates, it is better to speak as groups rather than to have no voice in national affairs.

Because our results have been largely negative, our experience may be of little value to engineers in Great Britain in working out a system of representation that will meet their needs. But if some effective restudy of our problem grows out of their having focused attention on the subject anew the final result may be of value to engineers on both sides of the Atlantic.

Novel Concreting Plant at Pilot Knob

Aggregates for All-American Canal job are stored in chutes at the batching-plant and concrete is handled by a cable-car incline.

For building the concrete channel and sidewalls of the Pilot Knob wasteway on the All-American Canal, the contractor, T. A. Allen Construction Co., Los Angeles, Calif., has developed a construction plant of uncommon type. Novel features include the storage of the concrete aggregates in the chutes that feed the batching plant and the handling of concrete from mixer to point of use in cable-hauled cars on an inclined trestle. The major part of the job was completed last month.

The wasteway, located near the Mexican border about 5 miles west of Yuma, Ariz., in the California desert, is an inclined channel 100 ft. wide at right angles to the canal, through which 10,000 sec.ft. of water can be turned back to the Colorado.

The accompanying illustrations show the batching plant located in the main canal several hundred feet from the wasteway turnout, and the construction operations on the wasteway looking up the channel toward the All-American Canal, which runs at right angles to it on top of the hill. The feature of the batching plant is the layout of fan-shaped chutes or bins resting on the sloping canal bank. Aggregates dumped into these bins from a construction road at the top of the bank slide down into a hopper from which they are elevated by a building skip hoist into the compartment hopper of the batcher plant. Trucks drive under the batcher plant to be loaded, pick up their cement at the adjacent storage house and continue on to the mixer located at the top of the wasteway.

Each of the four fan-shaped bins contains a different size aggregate. To secure efficiency in operation the sand bin is on a 1:1 slope and the three aggregate bins are on a flatter $1\frac{1}{4}$:1 slope. The canal is about 30 ft. deep at this point, and the bank slope is $1\frac{3}{4}$:1. The "chute" bins have a total capacity of 380 tons and the batcher bin 120 tons.

The mixer, of paver type, is, as stated, located at the top of the wasteway. Connecting it to the work along the wasteway and on the apron at the bottom is an inclined trestle carrying an industrial railway over which a bottom-dump hopper car is lowered by means of a cable attached to an electric hoist on the paver. Supplementary runways branching from the incline at various points permitted concrete buggies to be run under the hopper car, loaded with concrete and then wheeled to the forms. At the bottom of the incline the trestle was leveled off at a high enough elevation to permit the branch runways to reach most of the height of the counterforts for the wasteway training walls. Concrete for the top of these walls was lifted into place by cranes.

A novel use of this plant was the handling of 500 cu.yd. of rock for the reverse filter under the apron. This dock was run through the mixer, and transported down the incline by the cable car in the same way as was the concrete.

The Pilot Knob wasteway, as part of the All-American Canal, is being built by the U. S. Bureau of Reclamation.

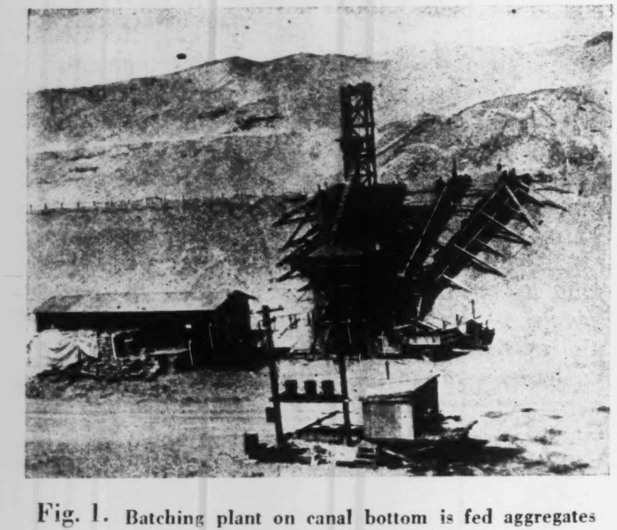

Fig. 1. **Batching plant on canal bottom is fed aggregates from fan-shaped bins laid on sloping bank of canal. Major aggregate storage is in these "chute bins."**

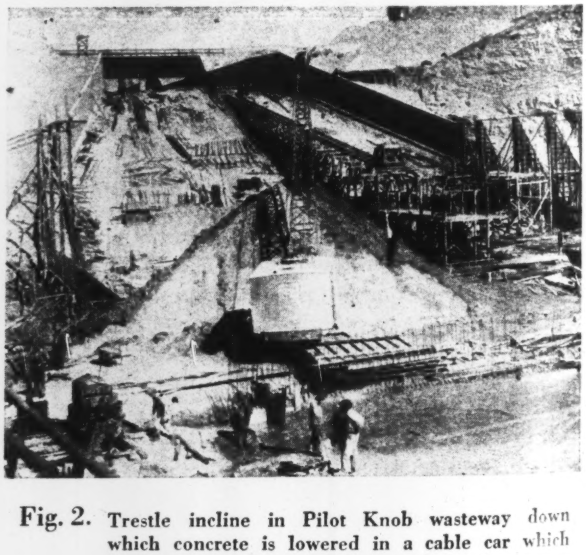

Fig. 2. **Trestle incline in Pilot Knob wasteway down which concrete is lowered in a cable car which discharges into buggies on level branch runways leading to forms.**

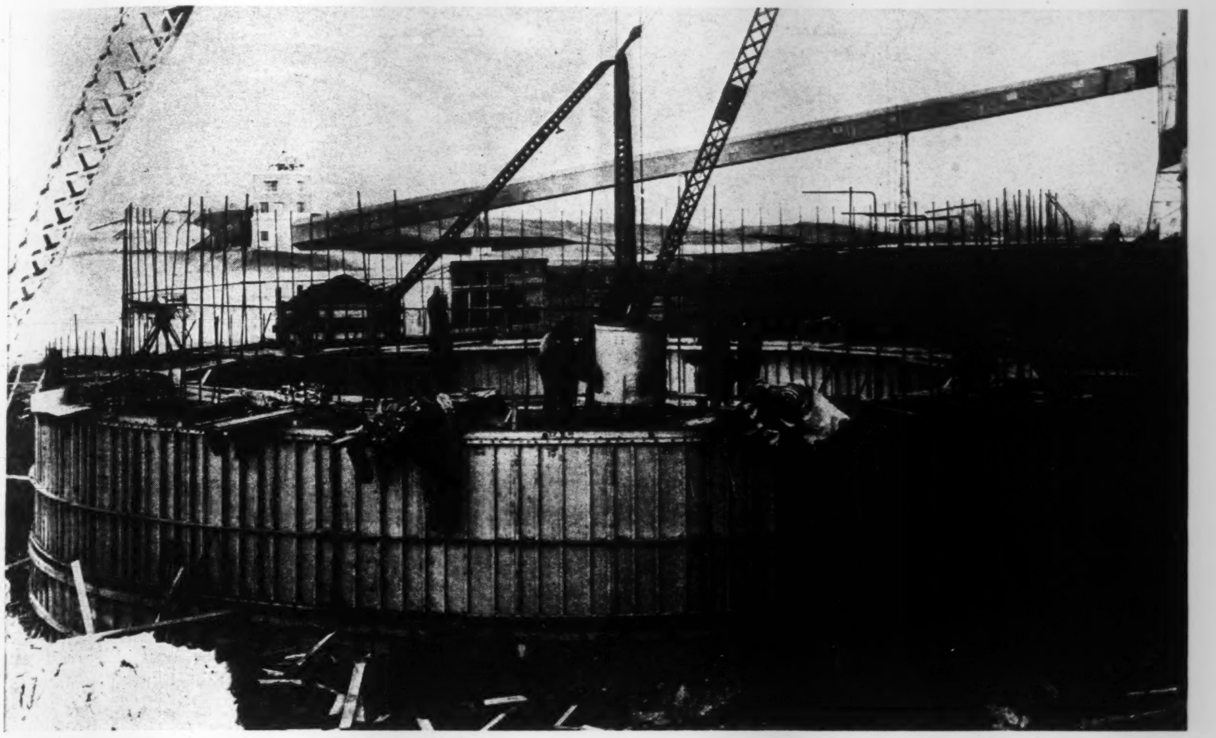

FIG. I. STEEL FORMS SET TO CONCRETE FIRST LIFT OF 82-FT. CAISSON

Controlled Caisson Sinking

L. F. Booth

H. J. Deutschbein Co., New York, N. Y.

Processes adopted to control line and level of 82-ft. circular caisson that brought it to $\frac{1}{2}$ in. of desired grade at 70 ft. depth

Sinking an 82-ft. circular concrete caisson, which because of premolded connections had to be spotted and leveled with precision, offers an interesting example of construction skill in the new power-plant extension of the Cincinnati Gas & Power Co. The soil at the site consists of about 20 ft. of clay that gets firmer and heavier with depth, beneath which lies about 20 ft. of sandy clay which is spongy and very soft when wet. Next comes good sand between El. +435 and El. +425, and excellent sand with some gravel, below that. There is no rock within reach by any practicable method.

The caisson design is shown by Fig. 1. Heavy horizontal reinforcement running around the well about 27 ft. above the cutting edge was provided, making the lower 27-ft. section of well act as a continuous circular girder. It was necessary, therefore, to concrete up to a level above this reinforcing before disturbing the caisson or removing its blocking. This required the blocking to be sufficient to support 27 ft. of the well (about 22,000 lb. per foot of perimeter) without undue or uneven settlement.

Blocks of 12 x 12-in. x 10-ft. timbers were placed as shown by Fig. 2 radially at 18-in. centers around the perimeter. The load of the caisson was imposed on the blocks both at the cutting edge and by heel posts which engaged the shoulder at the inside face. It was expected that when the heel posts were removed, the eccentric load of the cutting edge would press the outer ends of the block timbers into the soil and cause the inner ends to raise up, thus facilitating their removal.

The blocks were pulled one at a time from point to point around the perimeter in such a way that the support was uniformly diminished. The first 50 or 60 per cent pulled quite easily with a single-part derrick line. As the number of blocks decreased and the well settled and pressed them into the soil removal became more difficult, and more powerful rigging was required. The last eight or ten blocks could not be pulled and were cut off inside the well, the remaining ends being

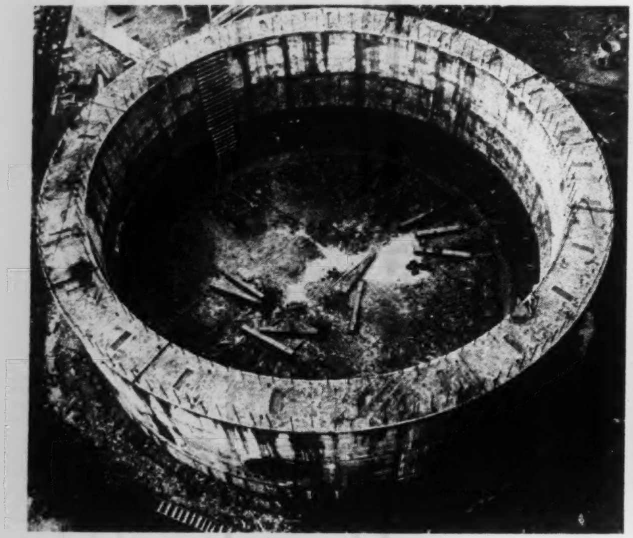

Fig. 2. Concreting was carried up to above the ring reinforcement with caisson resting on perfectly leveled blocking.

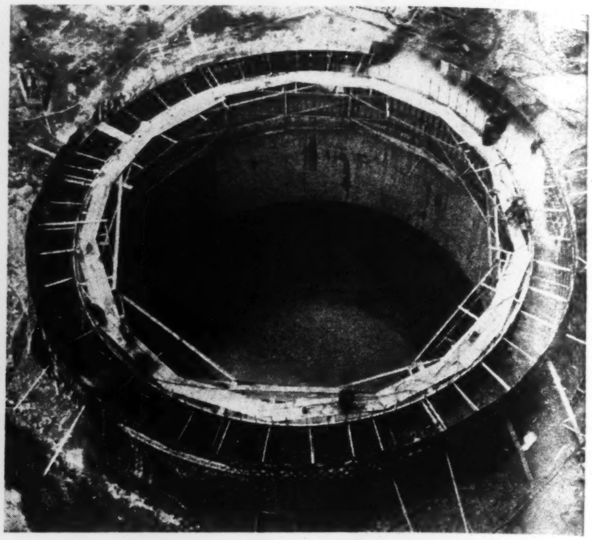

Fig. 3. Most of the sinking was done in the winter; tarpaulins hung ready to cover the concrete and steam pipes ready for heating.

pushed out of the way by the cutting edge as the well sank.

The blocking timbers were set to grade by instrument and the well perimeter was scribed on them so that the metal cutting edge sections could be set to line and grade before riveting. The cutting edge was then cleated to the blocking to prevent it from shifting during the construction of the first buildups. The blocking settled so uniformly (an average of about 3 in.) that after the first three lifts, about 27 ft., had been concreted, the cutting edge was within 1 in. of level across its 82-ft. diameter, and in the same position laterally in which it had been set.

The plumbness of the well as it sank was continually checked by level shots at the four axis points, and the digging and dredging was varied to control it. In the earlier stages a tendency of the well to drift was observed. This drift at one time amounted to about 6 in. It was partly overcome by digging ahead under one side of the caisson and dropping it out of plumb so that as it sank the cutting edge would travel back toward position. This procedure was followed during about 25 ft. of sinking. When the caisson reached its final grade and was levelled up it had come back to within 2 in. of its theoretical position.

Before the caisson was deep enough in the ground to develop any side friction, the cutting edge buried itself so that 50 or 60 per cent of the sloping face took bearing in the soil, but as the well got deeper and the side friction increased, more and more undercutting was required to cause it to sink. During most of the sinking the excavation around the edge was kept well ahead of the general level of the bottom (sometimes as much as 10 or 15 ft.) to reduce the possibilities of boiling. As the well approached its final grade this crowning was gradually flattened out, and even reversed so that the concave bottom required for the seal could be obtained with a small volume of additional dredging after the cutting edge had been stopped.

It had been found, when sinking was interrupted to build forms and concrete the various lifts, that the caisson continued to settle for a short time after dredging actually stopped so that the dredging finally was discontinued when the caisson was 3 in. above the plan elevation. In about three hours it had "coasted" most of that remaining distance, and it finally stopped within ½ in. of the desired grade.

For concreting the 10-ft. lifts of the caisson, a collapsible, self-supporting steel form was used. It consisted, both inside and out, of a plate-and-angle panel with a removable channel top and bottom, with three layers of ties, one through each channel and one through the panel somewhat below the center. When the form was removed after a pour the top channel was left in place to act as a support for the form for the next pour; and the channel ring which had been on the bottom for the pour completed, was placed above the panel to form the top 6 in. for the pour being made.

The inside forms were held plumb and in a true circle by two circular trusses in a horizontal plane, arranged with key pieces so that the form could be collapsed into four quarters for stripping and for raising it from position to position. The outside form was arranged to be divided into eighths.

The use of the steel forms, aside from leaving a smooth surface, permitted a substantial saving in time over ordinary forming methods; the complete form could be set in place and bolted and tied in less than two 8-hr. shifts, and could be unbolted and set down in less than one shift.

The concrete was placed in layers 12 or 18 in. deep, the operation started at one point and carried around the circle with sufficient speed to insure that the uncovered surface was always green, and in such a way that the load on opposite sides was roughly balanced.

The work was carried on under the supervision of C. W. DeForest, chief engineer of the Cincinnati Gas & Electric Co., with H. J. Deutschbein Co. of New York, contractor, and Sargent & Lundy of Chicago, consulting engineers.

New Water Supply for Salt Lake City

Deer Creek project which Reclamation Bureau is building will double the existing capacity of the city system and provide for 1980 needs

Water in the region of Salt Lake City is limited and any future large supply for the city must come from a distance. Last fall voters approved the Deer Creek project, a combination irrigation and domestic-supply project that had been fully studied by the U. S. Bureau of Reclamation. The latter has accepted the responsibility of providing a storage reservoir on Provo River and bringing water to the city through a 40-mile conduit skirting the foothills of the Wasatch Mountains between Provo and Salt Lake City.

Of note is the agreement of the bureau to assume the cost of building the conduit as well as the storage works. The city's share (46 per cent of cost of the project exclusive of the aqueduct and the full cost of the aqueduct) is to be repaid on the terms of the reclamation law—payment over 40 years without interest. In order to join the city's interest with that of nearby small towns and intervening irrigated areas that share in the supply, a Metropolitan Water District was set up some three years ago. The district is simply a subscriber to 46 per cent of the stock of the Provo River Water Users Association which will issue 100,000 shares of stock, one share against each acre-foot of water normally delivered from the reservoir. The Provo association will contract with the bureau. The district will probably contract directly with the bureau for the repayment cost of the aqueduct as the balance of the subscribers to the Provo association will not be benefitted by its construction.

As there was much controversy over the need for the additional supply, the availablity of other sources, relative costs and other points, advice was sought from the consulting engineering firm of Alvord, Burdick & Howson, which made a report from which the following

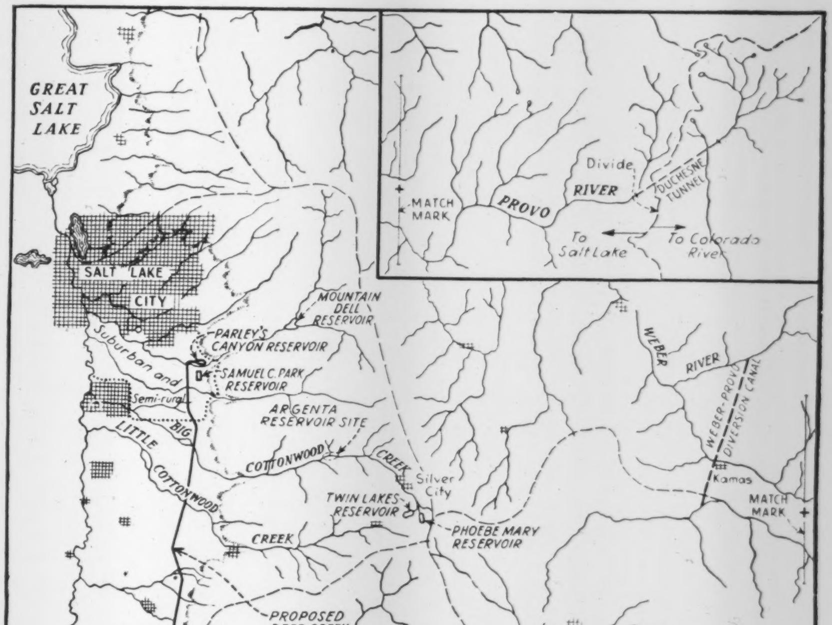
GREAT SALT LAKE
SALT LAKE CITY
MOUNTAIN DELL RESERVOIR
PARLEY'S CANYON RESERVOIR
SAMUEL C. PARK RESERVOIR
ARGENTA RESERVOIR SITE
Suburban and Semi-rural
LITTLE COTTONWOOD CREEK
BIG COTTONWOOD CREEK
Silver City
TWIN LAKES RESERVOIR
PHOEBE MARY RESERVOIR
PROPOSED DEER CREEK CONDUIT
TUNNEL
PROVO RESERVOIR CANAL
Associated Canals Pumping Plant
American Fork
UTAH LAKE
Pelican Point Pumping Plant
PROVO RIVER
Provo
GOSHEN BAY DIKE
Utah Lake Division Provo River Project
Proposed Pumping Plant and Spillway
Spanish Fork
PROPOSED DEER CREEK RESERVOIR
WEBER RIVER
WEBER-PROVO DIVERSION CANAL
Kamas
MATCH MARK
N
0 5 10
Scale in Miles
MATCH MARK
PROVO RIVER
Divide
DUCHESNE TUNNEL
To Salt Lake
To Colorado River

Fig. 1. Future water supply of Salt Lake City is to come around the mountains 40 miles from the Deer Creek reservoir which U. S. Bureau of Reclamation is building, largely for irrigation storage.

on the Salt Lake City phases of the project is abstracted:

The present supply of the city, which averages 28.3 m.g.d., comes from the canyons adjacent to the city; one-third from sources owned outright and the remainder through 25 exchange contracts whereby domestic water is secured either for cash or an actual exchange of culinary water or irrigation water (mostly polluted) from Utah Lake.

The existing capacity, including the groundwater developed in 1934, driest year on record, is 35,150 acre-ft. In 1934 the city used only 30,340 acre-ft., since no one knew how long the drought would last; in 1929, 37,619 acre-ft. was used. Normally only a minor part of the supply comes from wells, but in 1934 wells supplied more than one-half the water consumed in July.

Present and future needs

At present 148,000 people in and out of the city are supplied from the distribution system.

The report is based on these assumptions: 270,000 people in 1980, 200 gal. per capita, increasing 10 gal. per decade; and 3 m.g.d. necessary to serve culinary exchanges. Thus the present requirement is 32.6 m.g.d. (36,500 acre-ft. per year) and in 1980 it will be 68 m.g.d. (76,000 acre-ft.).

All water is measured into the mains and, as metered out of them, the system delivers 72 per cent, including free water metered to public institutions and to culinary exchanges. Revenues are less than $4 per capita, just about sufficient to pay operating expenses and the service on $4,631,500 of bonds. Annual payments by retirement exceed the necessary annual allowance to cover depreciation. Fixed assets are carried at $13,100,000. The low rate of $4, so the report states, cannot support an adequate additional supply from any source.

Two sources of supply were available; participation in the Deer Creek project and development of miscellaneous small sources.

The normal yield of the Deer Creek project is 100,000 acre-ft., in which the city would have a 46 per cent interest at an estimated cost of $3,371,294, to be repaid in 40 annual installments of $84,282 without interest. This new supply with that of the present is estimated to be capable of furnishing the 76,000 acre-ft. necessary in a repetition of a dry year like 1934. Between now and 1980, the time when the whole amount would be needed, sale of the surplus for irrigation of the high lands of the East Jordan Valley is contemplated.

Deer Creek project

The Deer Creek project (see *ENR* Dec. 9, 1937, p. 962) consists of a 150,000 acre-ft. storage reservoir on the Provo River some 10 miles upstream from the Olmstead power plant at the canyon mouth. The dam is to be an earthfill structure 155 ft. high and 1,400 ft. long on top. As all water in the Provo River has long been appropriated the storage will come from the Weber River by enlargement of an existing diversion canal, and from the Duchesne River (a Colorado River tributary) by transmountain diversion through a 5½ mile tunnel. Incidentally, this diversion will be the first step in the utilization of Colorado River water in the Salt Lake Valley.

A 66-in. concrete conduit, 40 miles long, skirting the Wasatch Range is planned to bring 130 sec.-ft. from the reservoir to the reservoirs of the Salt Lake system. The estimated cost is $5,500,000, all of which is to be repaid by the Metropolitan Water District of Salt Lake City. The reservoir will be 5½ miles long and when filled will have a surface area of 2,600 acres. Construction will involve relocation of the state highway and the line of the Denver & Rio Grande R.R., which follows the canyon. The bottom of the stored water in the Deer Creek reservoir is 390 ft. above high-water level in the Salt Lake Park Reservoir and 570 ft. above high-water level of Parleys reservoir, where filters are contemplated ultimately.

The annual cost to Salt Lake City of the Deer Creek additional supply is estimated at $223,000. For an equal amount of water from several other available sources, some of which are of doubtful purity and some so hard as to need softening, the estimated cost was placed at $413,000 annually. These latter supplies included the Argenta reservoir on Big Cottonwood Creek, a new Mountain Dell reservoir just below the site of the existing dam, and drainage water from the Silver King mine. The cost of the Deer Creek dam is placed at $3,775,000; Weber-Provo diversion enlargement $[illegible]000; Duchesne tunnel, $2,082,000; enlargement of Provo irrigation canal $882,000.

Utah Lake dike

Tied up with the Deer Creek project is a proposal to dike off a shallow portion of Utah Lake for the purpose of diminishing evaporation losses. It is proposed to increase the normal yield of the lake by 60,000 acre-ft., of which Salt Lake City would receive one third at an estimated cost of $20,000 annually. The city is interested since from Utah Lake is now obtained irrigation water to fulfill the exchange obligations by which mountain creek water is utilized for domestic consumption. Water rate increases of 33 per cent are considered necessary to finance the city's portion of these projects.

The board of the Metropolitan Water District of Salt Lake City is composed of seven members; George D. Keyser, commissioner of water supply and waterworks of Salt Lake City, is a member of the board. The Provo River Water Users Association, with which the Bureau of Reclamation deals direct, has negotiated a contract whereby the excess storage capacity in the reservoir may be utilized by a subscriber for hold-over storage of water not utilized in one season. This concession is mainly of value to the city as the irrigation interests are likely to use all of their water each year. L. H. Kimball is chief engineer of the Metropolitan Water District.

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WPA Builds 20,000 Bridges

According to a June announcement of the Works Progress Administration, the total number of new bridge projects handled by that organization has passed the 20,000 mark. At the time of the latest formal count (Oct. 1, 1937) the WPA had completed projects involving the construction of 19,272 new bridges and the improvement of over 13,000 old bridges. Of the new bridges, 14,150 were of timber construction, 1,355 of steel, 3,767 of masonry. The average length of all bridges was 32 ft., of the wooden bridges, 29 ft., steel bridges, 60 ft., and the masonry bridges, 32 ft. The largest structure is at Charleston, W. Va.

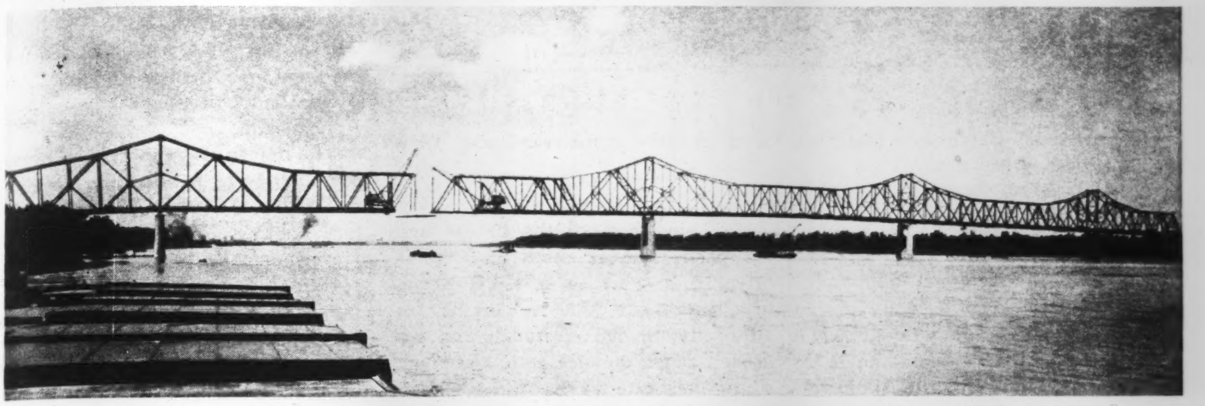


FIG. 1. CLOSURE OF THE NEW HIGHWAY BRIDGE ACROSS THE OHIO RIVER AT CAIRO, ILL.

Multiple Cantilever Completed at Cairo

Harry J. Engel

Assistant Engineer, Modjeski & Masters, Harrisburg, Pa.

Unusual structure of three main spans with only one suspended section replaces ferries on Ohio River crossing

Final preparations for the opening, July 1, of the new Ohio River highway bridge at Cairo, Ill., were completed this week. Begun in 1936 by the Cairo Bridge Commission, a body created two years earlier by an act of Congress, the new structure has a total length of 5,865 ft. in which there are three main river spans of 800, 650 and 650 ft., respectively, to accommodate navigation and large floodflows.

From a technical standpoint the bridge is notable for its multiple cantilever layout, consisting of a series of alternate cantilever and anchor arms for three spans, with a suspended span in only one opening. The hinge points occur near natural points of contraflexure, so that the structure simulates a continuous bridge with fixed points of contraflexure. This arrangement, illustrated diagrammatically in Fig. 2, is by no means new in principle for it merely extends the cantilever idea farther than is customary. But there is no record of its having been used before in a major structure in this country. The bridge provides a 20-ft. roadway for highway traffic and from 50 to 60 ft. of vertical clearance for river traffic. The approaches to the main river crossing consist of deck trusses and deck girders—one truss span and five girder spans on the Illinois side and nine truss spans and twelve girder spans on the Kentucky side.

The location of Cairo at the tip of the Illinois peninsula where the Ohio River joins the Mississippi River makes it a natural focal point of highway traffic, which, in recent years, has been served by a number of Ohio River ferries and a bridge over the Mississippi, the former connecting with through routes in Kentucky and Illinois and the latter with the main highways of Missouri. Since ferry service has usually been interrupted for several weeks each year because of high river stages, numerous proposals for toll highway bridges across the Ohio at Cairo have been made in the past. The present bridge project dates from a War Department permit first issued in 1928.

Foundations

The main river piers are founded at a depth of from 52 to 72 ft. below low water in a stratum of good white sand containing clay pockets, a material which tests reveal has a moisture content of about 20 per cent. It is the same stratum used for the foundations of the Illinois Central Railroad Bridge, about two and one-half miles upstream. Borings revealed that alternate layers of sand and clay extend at least 150 ft. below low water at the bridge site. All piers are of concrete, and each of the main river piers has an arched opening in the upper shaft above high water level. All of the approach piers are founded on 16-in. square reinforced concrete piles 35 ft. long.

Foundation construction operations, begun in October, 1936, soon encountered trouble from the great Ohio River flood of early 1937. The contractor had elected to use shallow air caissons for the footings of the main river piers, with attached cofferdams above. Air was turned on in the first caisson, that at the Kentucky end of the main river bridge, on Dec. 28, but on Jan. 3, with the overall height of the caisson and cofferdam amounting to 43 ft., such a substantial rise of the river occurred that it was decided to release the air and permit the caisson to be flooded. A week later only some pipes and air shafts of the caisson

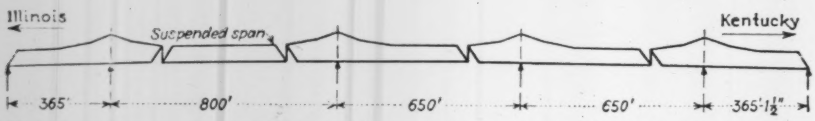


Fig. 2. Diagram of multiple cantilever layout of main river crossing of Ohio River bridge at Cairo.

projected above the rising water, and all of the pile driving that had been done on the Kentucky approach was inundated.

Some 600 cu.yd. of concrete had been placed in the caisson, and this provided enough weight to stabilize it against the swift current. It was not until March 13 that work could be resumed on the Kentucky approach and not until April 3 that operations were begun again at the caisson. It was found that the caisson had "decked itself" and that river bed materials had filled the working chamber and risen 6 ft. into the man shaft, requiring a substantial job of cleaning out.

After this long lay-off, foundation work proceeded rapidly and without mishap to completion of the substructure on Nov. 1. Some scour around the main piers occurred during high water stages in December, 1937, resulting in the decision to place stone rip-rap around the pier bases for future protection. The scour pits were filled in with 150- to 200-lb. stone to slightly above normal river bed level.

Steel erection

Superstructure work got under way in August, 1937, with the first operations being concentrated on the Kentucky approaches. Erection of the deck spans and girders was accomplished with a deck traveler; and the same traveler afterward proceeded to erect the main river cantilevers. Another traveler beginning on the Illinois side met the Kentucky traveler at the center of the suspended section in the first main span out from the Illinois shore.

The main bridge superstructure is generally of silicon steel, and is designed for H-20 loading. Fabricated sections are used throughout in the cantilevered trusses. Rolled wide-flange silicon steel stringers and floorbeams are employed on the main bridge to support the 7 in. reinforced concrete slab. On the approaches, transverse joist construction is used under the roadway slab.

The total cost of the bridge and approach roads is about $2,500,000, financed in part by a PWA grant. The state of Illinois is paying for all of the bridge approach and approach roads on its side of the river, while the state of Kentucky, as its contribution, is building a 3 mile road from the Kentucky end of the bridge to intersection with a main state highway at Wickliffe. The bridge will be operated as a toll structure by the Cairo Bridge Commission, a public body, of which Ray Williams is chairman.

The design and supervision of construction were handled by Modjeski & Masters, formerly Modjeski, Masters & Case, consulting engineers, Harrisburg, Pa. George H. Randall, principal assistant engineer, was in immediate charge of design, and W. C. Gorman was the resident engineer. The substructure contract was held by the Missouri Valley Bridge & Iron Co., and the superstructure fabrication and erection by the Mt. Vernon Bridge Co.

Presaturated Sand Bases

Julian Montgomery
State Highway Engineer, Austin, Tex.

When dry sand is stirred while water is slowly added, it rapidly bulks. The admixing of 5 or 6 per cent of water by weight may cause the sand to increase in volume as much as 20 or even 30 per cent. Further additions of water tend to pack the sand and decrease its volume. When the sand is saturated or inundated, the volume is about the same as when measured dry. The amount of bulking varies with the type of sand.

These characteristics of sand should be borne in mind when concrete pavement is placed on a sand base. If the sand is not perfectly dry or is not entirely saturated with water at the time the pavement is placed on it, it is apt to be in a bulked condition. If the sand is bulked, it will eventually become saturated with water under the pavement, settle and cause the pavement to settle, or leave it suspended on an air pocket or pockets to carry the traffic loads by the beam strength.

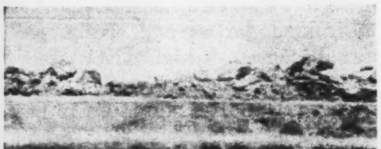


Fig. 1. Sample of cavities found under a concrete pavement where the sand base had settled due to saturation.

The plans for a pavement laid in Texas in 1935 called for a sand blanket to be placed entirely across the top of a clay-soil subgrade, and the pavement laid on the sand. A 20-ft. wide trench was first cut in the top of the clay subgrade; sand was then placed in the trench to the required 12 in. loose-measurement depth, and the 20 ft. concrete pavement was laid on the sand. The concrete was then cured by diking its edges with clay soil and keeping it covered with ponded water for 10 days.

After the curing period, when the clay shoulder soil was cut away to the bottom of the sand under the pavement in order to extend the sand blanket to intersections with the roadway side slopes, air pockets were found between the bottom of the edge of the pavement and the top of the sand blanket in several different places as illustrated.

It follows that to be sure the sand is thoroughly compacted, after the top of it is brought to the proper line and grade, it should be thoroughly saturated with water.

An Introduction To
THE CONSTRUCTION COST GUIDE
For 1938

THE contractor who said "I would rather know how to bid than how to build" correctly expressed, even if in somewhat extreme language, a formula for success in the construction business. For the ability to make a good cost estimate is as indispensable to a construction project as is the ability to design the structures, to operate construction equipment or to handle men. Since knowledge of cost factors such as materials prices, wage rates, bond and compensation charges, equipment rentals, previous bid prices, etc., is at the root of successful estimating, there is assembled in the pages that follow such information of this type as experience has shown to be useful.

In previous years, since 1927, the data have been published in booklet form under the title of *Construction Costs.* In presenting these statistics this year as the "Construction Cost Guide" of *Engineering News-Record,* it is hoped that they will as truly constitute an industry yearbook as they have formerly.

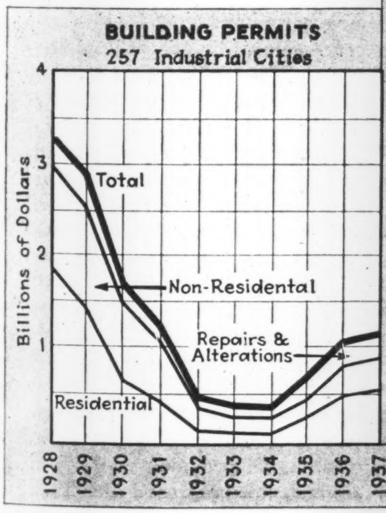
The guiding objective has been to present the statistics in useful and usable form, and no attempt is made at interpretation. The section is a reference manual for contractors, estimators, engineers, valuation specialists, appraisers and project and planning personnel generally, and should be used as such.

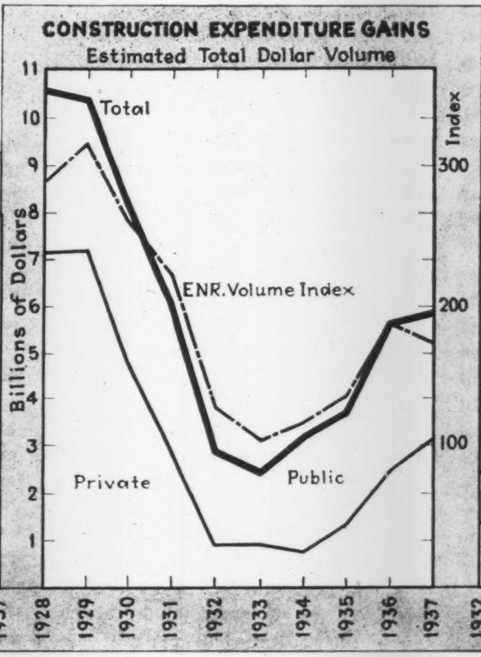
Construction volume

The cost figures as presented in this section are quite distinct from what are generally referred to as "construction statistics." These latter relate largely to volume of construction, its distribution and its rise and fall. They measure the level of construction activity, and are not cost factors in the more narrow sense. On the other hand, costs are markedly influenced by the level of construction activity, and so these volume figures have a place in the scheme of this Construction Cost Guide. Furthermore, since they reflect the state of health of the industry and its various components, such as buildings, water supply, roads, etc., they have an immediate importance to manufacturers of construction equipment and materials whose selling program, to be successful, must be directed to those fields and to those parts of the country where the market is most active. An essential part of this introduction, therefore, is consideration of the volume of construction.

In 1937, construction gained about 5 per cent in volume over 1936. Of the $5,852,000,000 estimated total for the United States, $3,046,000,000 was private work, which gained 24 per cent, and $2,806,000,000 was public construction, which lost 10½ per cent over the previous year. Private work exceeded public for the first time since 1930.

Engineering News-Record's reported contracts, which exclude residential and other small work contained in the above figures, totaled $2,437,000,000, a 4 per cent gain over 1936. While these reported figures cover less than half of the total construction volume of all types, they nevertheless are consistent from





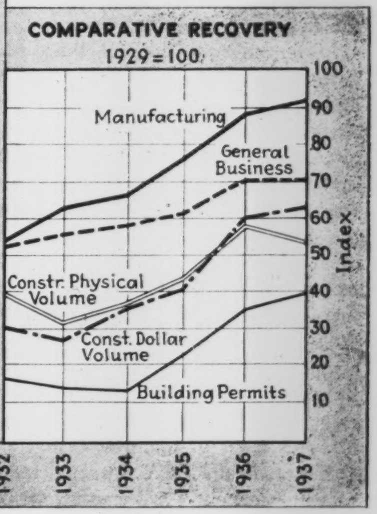


Table 1—How 1937 Construction Was Divided Among Fields and Geographical Divisions

Projects included in the totals reported in the table are of the following minimum cost; Waterworks, excavation, drainage and irrigation, $15,000; *other public works* $25,000; *industrial buildings,* $40,000; *other buildings,* $150,000.

ENR figures for 52 Weeks — Thousands of Dollars (000 Omitted)

Public Works	New England	Middle Atlantic	South	Mid West	West of Mississippi	Far West	United States 1937	United States 1936	% Change	Canada 1937	Canada 1936
Waterworks	5,521	60,410	5,156	8,190	10,766	14,406	**104,449**	92,478	+15	3,089	2,02
Sewerage	1,987	42,202	3,752	30,288	13,209	3,856	**95,294**	121,056	−20	1,448	2,00
Bridges, public	11,561	42,557	21,825	17,775	19,091	12,421	**125,230**	173,749	−27	7,198	5,10
Earthwork and waterways	1,471	19,266	11,343	11,323	41,485	25,465	**110,353**	181,685	−38	17,719	3,93
Streets and roads	16,989	87,329	73,618	93,622	98,903	44,076	**414,537**	483,475	−13	39,601	25,51
Buildings, public	18,167	129,571	36,689	61,755	53,513	33,703	**333,398**	435,926	−22	17,979	6,68
Unclassified, public	4,071	83,914	9,830	9,412	13,516	17,753	**138,496**	132,469	+ 7	6,296	5,44
Total public	**59,767**	**465,249**	**162,213**	**232,365**	**250,483**	**151,680**	**1,321,757**	**1,620,838**	**−17**	**93,330**	**50,711**
Federal government (included in above classifications)	5,552	44,036	24,794	29,784	52,571	48,851	**205,588**	319,538	−35	....	....
Private											
Bridges, private	209	5,849	837	270	594	100	**7,859**	14,067	−43	13	70
Buildings, industrial	25,292	193,328	52,131	109,512	48,957	48,078	**477,298**	309,477	+57	34,047	33,44
Buildings, commercial	24,099	323,587	18,211	47,974	21,595	24,503	**459,969**	274,784	+71	5,696	4,46
Unclassified, private	2,627	70,351	8,987	32,602	36,789	19,384	**170,740**	167,679	+ 4	2,422	5,10
Total private	**52,227**	**593,115**	**80,166**	**190,358**	**107,935**	**92,065**	**1,115,866**	**766,007**	**+48**	**42,178**	**43,08**
Grand total — 1937 — (52 weeks)	**111,994**	**1,058,364**	**242,379**	**422,723**	**358,418**	**243,745**	**2,437,623**	....	**+ 4**	**135,508**	.....
Grand total — 1936 — (53 weeks)	**148,295**	**775,769**	**308,735**	**423,135**	**444,978**	**285,933**	....	**2,386,845**	......	....	**93,793**

Table 2—And How 1938 Fared During the First Five Months

ENR Figures for Twenty Weeks — Thousands of Dollars (000 Omitted)

Public Works	New England	Middle Atlantic	South	Mid West	West of Mississippi	Far West	United States Five Months 1938	United States Five Months 1937	% Change	Canada 1938	Canada 1937
Waterworks	1,930	28,255	1,725	3,804	4,910	3,450	44,074	37,700	+17	2,074	1,917
Sewerage	2,449	13,726	2,965	12,663	6,733	2,844	41,380	43,795	−5	309	548
Bridges	1,529	12,243	3,860	5,828	6,487	4,144	34,091	44,816	−24	3,467	4,837
Earthwork and waterways	2,313	10,932	4,492	4,646	24,052	49,039	95,474	36,948	+156	818	1,930
Streets and roads	8,692	41,776	30,802	33,718	44,557	25,562	185,107	134,333	+38	4,088	25,287
Buildings, public	5,340	66,793	14,712	20,202	24,633	15,681	147,361	125,854	+17	4,151	2,153
Unclassified, public	1,961	21,630	3,517	5,568	8,253	5,106	46,035	53,403	−14	2,201	1,738
Total Public	**24,214**	**195,355**	**62,073**	**86,429**	**119,625**	**105,826**	**593,522**	**476,849**	**+25**	**17,108**	**38,410**
Federal government (included in above classifications)	1,649	15,743	8,070	3,490	17,373	52,056	98,381	72,281	+25	......	......
Private											
Bridges, private	13	3,954	62	....	135	85	4,249	3,896	+ 9	......	......
Buildings, industrial	6,052	19,005	10,287	17,438	19,458	7,272	79,514	202,157	−60	6,413	9,735
Buildings, commercial	14,434	238,647	14,331	13,315	20,911	10,465	312,103	195,197	+60	3,190	3,476
Unclassified, private	1,466	14,551	10,944	2,776	7,649	5,091	42,477	92,930	−54	1,622	450
Total Private	**21,965**	**276,157**	**35,626**	**33,529**	**48,153**	**22,913**	**438,343**	**494,180**	**−11**	**11,225**	**13,661**
Grand Total — Public and Private											
Five months — 1938	46,179	471,512	97,699	119,958	167,778	128,739	1,031,865	....	+ 6	28,333	......
Five months — 1937	48,313	453,516	84,959	154,161	132,890	97,190	....	971,029	......	......	52,071

year to year and so give a true picture of conditions. The analysis given here is based upon the *ENR* reported contracts.

All of the above measures are in dollars but, when account is taken of the rising costs that characterized the year, the structure volume is seen to have dropped 7½ per cent below the 1936 figure. We spent more for construction in 1937, but we got less for it.

Measured against 1929, the dollar volume of 1937 was 62½ per cent and the structure volume 54 per cent; against the depression low figure, a 223 per cent gain in dollars and a 169 per cent gain in structures was recorded. General business, on the other hand, stood at 70 per cent of its 1929 level and 133 per cent of its depression low, while manufacturing reached 91½ per cent of 1929 and 173 per cent of 1932. Construction, it should be noted, continued to lag behind recovery in other lines, although its gain in 1937 exceeded that of manufacturing.

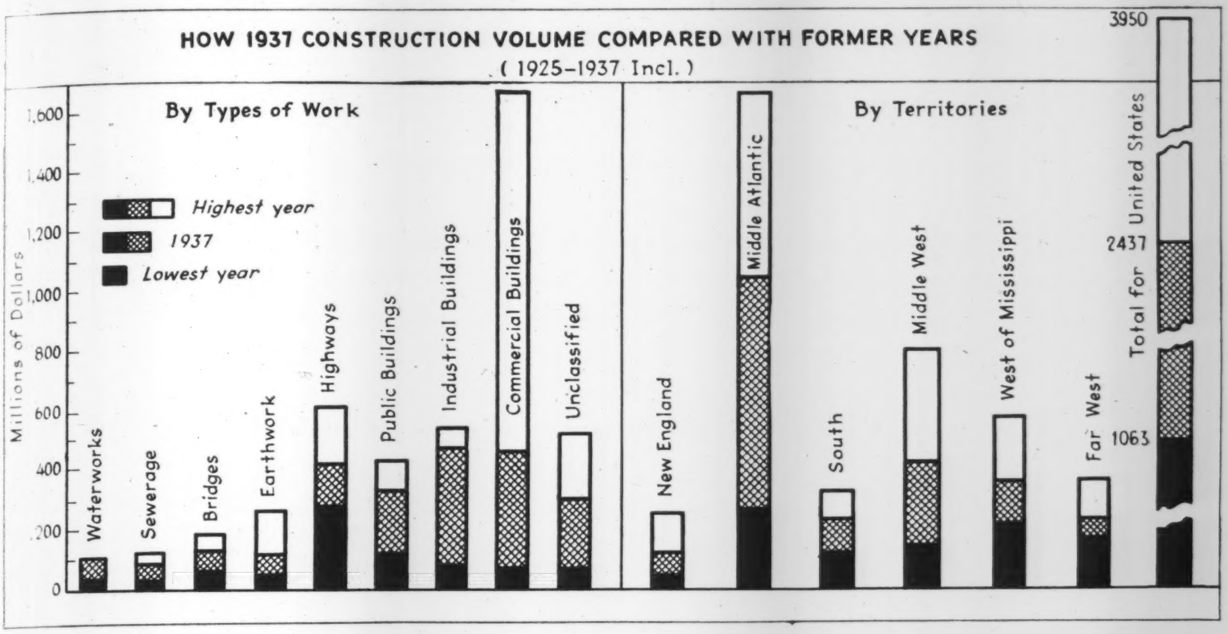
Based on the *ENR* reported totals, private work in 1937 was up 48 per cent over 1936, aided particularly by the second highest year on record for industrial buildings, which totaled $477,000,000, a 51 per cent increase over 1936. Commercial buildings, at $460,000,000, were 68 per cent ahead of 1936, but still far below their peak years. In the public construction field, a 17 per cent decline was recorded. The detailed figures are given in Table 1, which also lists the geographic activity, which was featured by gains of 39 per cent in the Middle Atlantic States and 2 per cent in the Middle West.

For the first five months of 1938, as detailed in Table 2, *Engineering News-Record* reported contracts totaling $1,031,865,000, a gain of 6½ per cent over 1937. Public work is up 25 per cent and private construction is down 11 per cent, the reverse of the situation last year. The current decline in private work is attributed to a loss of 60 per cent in industrial buildings over the first five months of 1936, but there is a bright side to the picture in a gain of 60 per cent in commercial buildings, particularly large-scale private housing. In the public works field, waterworks is up 17, earthwork and waterways 158, streets and roads 38 and public buildings 17 per cent. So far, 1938 is a better construction year than 1937, which means it is the best since 1931.

Taking construction activity as a whole, residential building continues to suffer most. Last year, according to the Bureau of Labor Statistics, building permits for 257 cities recovered to only 35 per cent of the 1929 total. The total number of nonfarm housing units built is variously estimated at from 220,000 to 285,000, which compares with an annual average of 675,000 for the ten-year period from 1920 to 1929. In the current year, building permit totals have shown no improvement and, for the first five months, are about 10 per cent below last year.

Money for construction

One reason for the continued high state of construction in 1938 lies in the new capital provided in 1937, in an amount that exceeded the 1936



total by 37 per cent. The 1937 figure was $1,048,000,000, divided about half and half between state and municipal bonds and corporate securities. There were in addition $200,000,000 for federal road aid, $471,000,000 for other federal construction, and $1,100,000,000 for WPA construction work.

Municipal financing at about a 3 per cent interest rate in 1937 continued at the lowest level in years, but the low rates (4 to 4½ per cent) on utility, industrial and railroad bonds which prevailed during the first half of the year rose sharply to 5 and 5½ per cent and in the case of railroads to 6½ per cent by the beginning of 1938. As the interest rates indicate, municipal credit is unusually good, while corporate credit reflect fears of continued punitive measures by the federal government.

Cost factors

Materials prices and wage rates as factors in construction costs are presented in detail in later pages of the Guide. Measured by 1929 prices, cement prices in 1937 stood at 104 per cent, lumber prices at 105 per cent, and steel prices at 115 per cent. Wage rates also advanced in 1937, skilled reaching 102 per cent and common 124 per cent of the high 1929 rates. During 1938 there has been a flattening out of materials and labor cost trends but, except for lumber, which has dropped steadily since June, 1937, there is no present indication of substantial decreases in these cost factors.

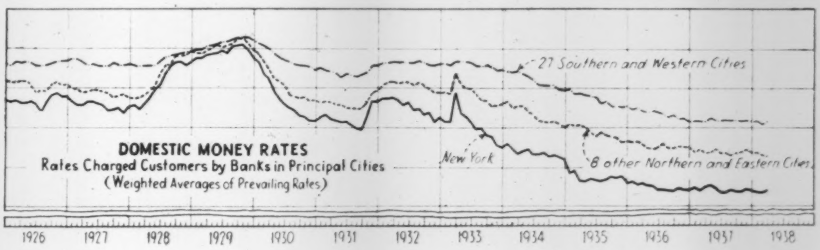
A third cost factor, domestic money rates, is charted below. On this one item, and on it alone, contractors and other short term borrowers have enjoyed a declining trend for a number of years.

Current trends

With half of 1938 history, the pattern indicated by 1937 events has not been materially different than predicted. The falling curve of private construction has flattened out. Residential construction shows some sign of equaling last year's modest total particularly in view of the fact that the Federal Housing Administration has been insuring mortgages at the rate of about $16,000,000 a week while the United States Housing Authority has made loans of about $110,000,000 to local Housing Authorities and has estimated that it will continue to make such loans at the rate of about $50,000,000 a month for the remainder of the year. Public works at 125 per cent of last year should hold the gain, particularly in view of the new relief appropriation, giving WPA a new lease on life and reviving the PWA.

Costs probably are frozen at current levels because of wage contracts. In addition, since contractors and materials and equipment manufacturers must pay social security imposts and the increased taxes which government expenditures have made necessary, these costs also must be absorbed. Lost time from strikes has been much less, however, than in 1937, when 59,000 man-days per month were lost, a 100 per cent increase over 1936. This is a factor tending to reduce costs. Union agreements with the United States Housing Authority to bar strikes on low-cost housing work constitute a reassuring sign in this direction.

In summation, it is probable on present outlook that for the remainder of the year the present $50,000,000 weekly contract average will be maintained, and that present costs will prevail without much change.



ENR Construction Cost Index

THE *Engineering News-Record* Construction Cost Index reports a national trend of general construction costs in the United States. It has four components, (1) structural steel shapes at Pittsburgh; (2) cement at Chicago; (3) lumber, which until 1935 was 12 x 12 Long Leaf yellow pine wholesale at New York, and since 1935 is 2 x 4 S4S pine and fir in carload lots, *ENR* 20-cities average; (4) Common labor, *ENR* 20-cities average of wage rates in force.

The weighting for the original price series is given in the following computation for the December, 1934 index:

Steel 25 cwt. x 1.80 = 45.00
Lumber 0.6 x 61.00 = 36.60
Cement 6 x 2.00 = 12.00
Labor 200 x .5413 = 108.26

Index 201.86

The weighting for the new lumber price series is 1.088, and the computation for January, 1938 index is:

Steel 25 cwt. x 2.25 = 56.25
Lumber 1.088 x 31.99 = 34.77
Cement 6 x 2.10 = 12.60
Labor 200 x .680 = 136.00

Index 239.62

This Construction Cost Index is designed to predict changes in construction cost trends and to measure the movement of construction costs in general. It is not intended to apply to any specific class of construction or to a particular locality.

ENR Building Cost Index

In practice, the construction cost index has been used widely to apply

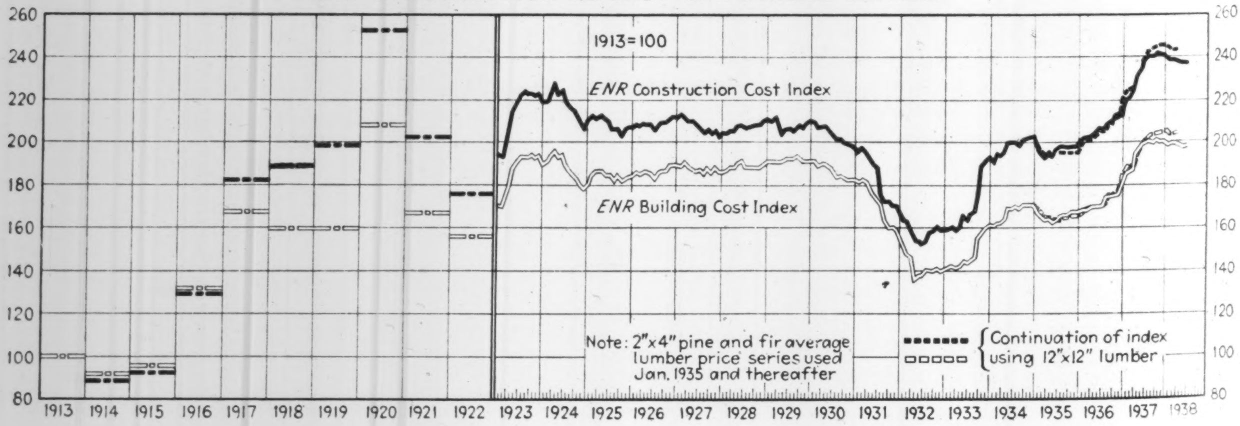
Engineering News-Record Construction Cost Index—1913 = 100

Yearly averages prior to 1914			1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
		J	89.22	87.12	112.66	167.75	184.51	198.05	206.55	2370.8	168.72	191.70	217.90	210.40	207.15	211.50	203.90	209.40	208.96
1903.....	93.90	F	89.22	87.36	116.66	167.75	184.51	201.50	225.10	230.67	168.72	197.40	220.30	209.70	206.55	210.15	204.65	210.40	206.46
1904.....	87.40	M	88.97	87.66	125.16	175.66	184.51	198.05	240.85	224.27	162.04	205.25	224.70	210.20	207.65	208.80	204.65	207.78	206.80
1905.....	90.55	A	87.97	90.16	129.51	183.41	186.01	191.25	265.20	213.07	164.72	213.50	221.60	209.55	207.05	209.00	206.40	203.40	207.12
1906.....	95.10	M	88.62	90.16	131.06	187.61	186.01	191.25	268.90	210.82	164.62	216.70	222.38	207.20	207.30	206.80	207.00	205.15	205.86
1907.....	100.55	J	87.87	88.96	128.71	199.26	186.31	191.85	273.80	209.82	166.62	220.70	216.85	204.60	204.80	205.55	206.15	205.65	203.36
1908.....	97.20	J	88.12	90.51	127.96	204.01	188.65	193.65	265.65	203.82	169.70	222.10	214.40	204.60	207.80	203.68	206.65	204.77	200.95
1909.....	90.92	A	90.11	91.76	128.76	198.41	193.85	196.65	252.00	193.47	173.40	221.50	213.15	204.60	208.30	205.50	207.29	205.91	200.95
1910.....	96.33	S	90.36	93.01	131.76	190.31	193.85	202.85	255.20	188.27	185.00	221.50	211.25	202.10	208.30	203.60	207.29	207.57	199.58
1911.....	93.43	O	88.51	96.16	135.11	167.11	193.85	202.25	255.20	182.57	188.60	220.30	207.55	205.35	209.80	204.40	207.71	206.32	198.72
1912.....	90.70	N	87.26	101.06	138.16	166.51	193.55	206.85	255.32	166.32	188.60	220.90	205.70	205.95	210.80	201.98	209.46	208.46	198.54
1913.....	100.00	D	86.51	107.06	149.41	167.11	194.75	206.85	251.62	167.82	192.60	217.30	208.58	205.95	210.80	203.90	210.16	209.46	196.86
		Aver.	88.56	92.58	129.58	181.24	189.20	198.42	251.28	201.81	174.45	214.07	215.36	206.68	208.03	206.24	206.78	207.02	202.85

Engineering News-Record Construction Cost Index—1926 = 100

Yearly averages prior to 1914			1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
	1926 = 100	J	42.9	41.9	54.2	80.6	88.7	95.2	99.3	110.0	81.1	92.2	104.7	101.1	99.6	101.7	98.0	100.6	100.4
		F	42.9	42.0	56.1	80.6	88.7	96.9	108.2	110.9	81.1	94.9	105.9	100.8	99.3	101.0	98.4	101.1	99.2
1903.....	45	M	42.8	42.1	60.3	84.4	88.7	95.2	115.8	107.8	77.9	98.7	180.0	101.0	99.8	100.3	98.4	99.9	99.5
1904.....	42	A	42.2	43.3	62.0	88.2	89.5	91.9	127.5	102.4	79.2	102.6	106.5	100.7	99.5	100.4	99.2	97.8	99.6
1905.....	43½	M	42.6	43.3	63.0	90.2	89.5	91.9	129.3	101.3	79.1	104.2	106.9	99.6	99.7	99.4	99.6	98.6	99.0
1906.....	46	J	42.2	42.7	61.9	95.8	89.5	92.2	131.6	100.9	80.1	106.1	104.3	98.4	98.5	98.8	99.1	98.9	97.8
1907.....	51	J	42.4	43.5	61.5	98.1	90.7	93.1	127.6	98.0	81.6	106.8	103.1	98.4	99.9	97.9	99.3	98.4	96.6
1908.....	47	A	43.3	44.1	62.0	95.4	93.2	94.5	121.1	93.0	83.4	106.5	102.4	98.4	100.1	98.8	99.6	99.0	96.6
1909.....	44	S	43.4	45.1	63.3	91.5	93.2	97.5	122.7	90.5	88.9	106.5	101.5	97.1	100.1	97.9	99.6	99.8	95.9
1910.....	46	O	42.5	46.2	64.8	80.3	93.2	97.2	122.7	87.8	90.7	105.9	99.8	98.7	100.9	98.3	99.8	99.2	95.5
1911.....	45	N	41.9	48.4	66.4	80.0	93.0	99.4	122.7	80.0	90.7	106.2	98.9	99.0	101.3	97.1	100.7	100.2	95.4
1912.....	43½	D	41.1	51.4	71.8	80.3	93.6	99.4	121.0	80.6	92.6	104.5	100.2	99.0	101.3	98.0	101.0	100.7	94.6
1913.....	48																		
		Aver.	42.5	44.5	62.2	87.1	90.9	95.3	120.8	97.0	83.8	102.9	103.5	99.4	100.0	99.1	99.4	99.5	97.5

ENR CONSTRUCTION *Cost Index* – *ENR* BUILDING *Cost Index*



to building costs, and when common and skilled labor rates move in similar trends it is a satisfactory measure of relative building cost movement. However, following the low wage rates of 1932, common labor climbed much faster than skilled and reached new all-time highs by July, 1937. The increase was in the lower ranges between union and non-union. When "prevailing" wages became synonymous with union wages the gap closed up, hence the *ENR* 20-cities wage average increased more rapidly than the union rates.

To provide a more representative measure of building cost movement, the skilled labor trend has been substituted for the common labor trend in the *ENR* Construction Cost index, and the *ENR* Building Cost index computed. The labor weighting applied to the *ENR* skilled labor average for 20-cities thus becomes 68.38 hr., and the computation for the Jan. 1938 Building Cost Index is:

Steel	25 cwt. x 2.25 =	56.25
Lumber	1.088 x 31.99 =	34.77
Cement	6 x 2.10 =	12.60
Labor	63.38 x 1.391 =	95.00
Index		198.62

Construction Cost Index—1913=100

1931	1932	1933	1934	1935*	1936*	1937*	1935†	1936†	1937†	1938†	1939	1940	
194.48	162.48	158.44	191.26	198.72	199.48	223.45	198.22	201.23	221.20	239.62			J
196.61	161.82	159.30	194.06	196.02	201.20	223.45	195.07	201.33	222.05	238.99			F
194.51	157.24	158.44	194.06	194.26	201.20	225.25	194.41	201.63	224.75	238.79			M
191.63	153.12	160.16	195.86	194.50	202.20	230.25	194.65	202.80	231.35	237.95			A
189.33	152.78	164.39	199.61	194.06	203.40	233.25	193.96	204.05	233.45	236.80			M
187.23	152.20	163.41	199.61	194.78	204.60	238.15	196.73	205.08	237.25	.....	.....	.....	J
174.37	153.36	165.50	199.65	195.18	204.40	241.75	197.43	204.80	239.90	.....	.....	.....	J
171.38	156.80	167.00	198.40	195.10	208.10	242.95	197.45	208.48	240.65	.....	.....	.....	A
171.40	157.96	175.48	200.58	195.10	208.10	243.95	197.30	208.88	241.62	.....	.....	.....	S
169.78	159.16	187.74	200.86	195.10	211.50	244.55	197.50	211.53	241.90	.....	.....	.....	O
169.28	158.20	190.14	201.36	194.90	212.70	244.95	197.35	211.50	241.40	.....	.....	.....	N
166.23	158.46	192.14	201.86	194.90	220.05	244.95	197.20	215.70	241.05	.....	.....	.....	D
81.35	156.97	170.18	198.10	195.22	206.41	236.41	196.44	206.42	234.71	.....	.....	.....	Aver.

Construction Cost Index—1926 = 100

1931	1932	1933	1934	1935*	1936*	1937*	1935†	1936†	1937†	1938†	1939	1940	
93.5	78.1	76.2	91.9	95.5	95.9	107.41	95.3	96.7	106.2	114.9			J
94.5	77.8	76.6	93.3	94.2	96.7	107.41	93.8	96.8	106.7	114.9			F
93.5	75.6	76.2	93.3	93.4	96.7	108.18	93.5	96.9	108.0	114.8			M
92.1	73.6	77.0	94.1	93.5	97.2	110.64	93.5	97.5	111.2	114.4			A
91.0	73.4	79.0	95.9	93.3	97.8	112.08	93.2	98.2	112.0	113.8			M
90.0	73.2	78.5	95.9	93.6	98.4	114.48	94.6	98.5	113.8				J
83.8	73.7	79.6	96.0	93.8	98.3	116.21	94.9	98.4	115.1				J
82.4	75.4	80.3	95.4	93.8	100.0	116.78	94.9	100.2	115.7				A
82.4	75.9	84.4	96.4	93.8	100.0	117.27	94.9	100.4	115.9				S
81.6	76.5	90.2	96.6	93.8	101.7	117.55	95.0	101.5	116.1				O
81.4	76.0	91.4	96.8	93.7	102.2	117.75	94.9	101.5	115.8				N
79.9	76.2	92.4	97.0	93.7	105.8	117.75	94.8	103.4	115.7				D
87.1	75.4	81.8	95.2	93.8	99.2	113.63	94.4	99.2	112.7				Aver.

* Superseded by figures in last four columns using 2 x 4 fire and pine lumber component.
† Using 2 x 4 S4S fir and pine lumber component instead of 12 x 12 yellow pine as in previous years.

New Lumber Price Series

The price of 12-in. x 12-in. long leaf yellow pine, used in *Engineering News-Record* Construction Cost index, has been replaced by a composite 20-cities price average of 2 x 4 Douglas fir and Southern or local pine, S4S, carload lots. The weighting given to lumber in this index has been adjusted on the basis of 1936 averages, and on the difference in price level of the old and new lumber price series, so that the 1936 *ENR* Construction Cost index average will not be changed. This weighting thus changes from 600 bd. ft. 12 x 12 LLYP to 1.088 bd. ft. *ENR* 20-cities composite average pine and Douglas fir, 2 x 4 S4S.

It happens that the only long-time lumber price records available are based on long leaf yellow pine. In recent years, however, price quotations for 12 x 12 size in this species have not reflected an active market. This situation promises to become more acute as time goes on.

The new 20-cities 2 x 4 fir and pine lumber price series reflects an active market and gives a superior measure of national movement in lumber prices.

Base Conversion Table

To convert *ENR* Construction and Building Cost Indexes

From
1913 = 100 Base
To Divide 1913 = 100 Values By

	Const. Cost	Bldg. Index
1926=100	2.0803	1.8499
1929=100	2.0702	1.9086
1910–14=100 ..	.9380	..
1924=100	2.1536	1.8578
1923–25=100 ..	2.1204	1.8481
1914=100	.8856	.9191
1911=100	.9343	.....

Engineering News-Record Building Cost Index—1913 = 100

Yearly Average prior to 1922			1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935†	1936†	1937†	1938†
1913..	100.00	January	147.12	168.20	189.30	182.70	184.25	187.80	185.90	190.00	190.30	180.70	150.60	140.82	160.15	166.50	168.25	185.45	198.62
1914..	91.91	February	146.47	172.55	191.70	184.50	183.65	189.15	187.15	190.00	188.50	181.95	147.20	141.70	161.30	165.75	168.43	186.55	198.99
1915..	95.28	March	145.19	178.40	194.10	184.50	184.25	187.30	187.15	190.00	189.20	180.19	145.88	140.80	161.70	164.10	169.68	187.65	199.29
1916..	130.88	April	147.12	186.00	191.80	184.65	184.05	186.00	188.80	190.00	188.80	177.55	135.68	141.50	163.15	164.40	170.00	194.95	198.21
1917..	166.79	May	149.02	188.90	192.48	182.80	183.55	185.40	190.10	191.25	187.90	174.55	136.38	143.85	168.15	163.30	170.25	197.15	197.86
1918..	159.10	June	149.77	191.30	187.65	183.00	181.80	185.75	187.55	191.95	185.40	172.45	137.58	143.20	168.15	164.85	170.18	199.20	
1919..	158.77	July	150.85	191.40	184.50	180.20	184.30	183.88	187.55	191.95	183.25	170.45	139.48	144.30	169.15	165.25	170.85	199.80	
1920..	207.23	August	154.55	191.50	183.25	183.00	185.10	186.50	187.55	192.75	183.65	163.10	139.40	145.90	168.40	166.20	173.93	200.65	
1921..	166.05	September	164.15	192.20	181.35	180.50	185.10	184.60	187.55	191.55	182.40	159.50	139.60	154.50	170.10	166.05	174.33	200.62	
		October	167.75	191.00	178.35	181.75	187.95	186.60	187.55	190.30	181.80	159.50	140.00	157.05	170.20	167.30	175.33	201.00	
		November	167.08	192.35	176.50	182.35	187.95	184.98	188.00	190.30	181.80	158.30	139.50	159.00	170.20	167.30	175.50	200.30	
		December	169.10	188.00	178.38	183.05	187.95	185.10	190.00	190.30	181.80	154.95	140.00	160.70	170.20	167.15	179.30	200.45	
		Average......	154.85	185.98	185.78	182.67	184.99	186.09	187.97	190.86	185.40	169.43	140.94	147.78	166.74	165.76	172.18	196.15	

Special Building Cost Indexes

Building cost indexes, reported here in both tabular and chart form, represent a variety of methods of measuring cost changes and trends. The indexes vary with type of building, with the location represented, and with the method of computing the index.

Aberthaw Index—Computed by repricing, each quarter, a seven-story and basement reinforced concrete (62′ 4″ x 202′ 4″) building constructed in New England in 1914. Repricing is on same basis as though a construction bid were to be submitted to duplicate the original building. Current market prices for materials and bids from sub-contractors are obtained. Labor costs are based on current experience with similar construction.

American Appraisal Co. Index—Averages four types of buildings—wood frame; brick-wood frame; brick-steel frame; and reinforced concrete, based on a national average covering 30 cities. These indexes cover structural items only, and do not include factors for plumbing, heating, lighting and elevators. The index figures are calculated on the basis of normal average material prices, average labor wages, and the market conditions in thirty representative cities. They do not reflect extremes such as premium prices and over-time wages for rush work during boom periods or the "extreme low" of cut-throat practices during depressions. Reported monthly.

Associated General Contractors Index—Combines wages and materials in the proportion of 40 and 60 per cent respectively. Wages are prevailing rates paid for hod carriers and common labor, and prices are for sand, gravel, crushed stone, portland cement, common brick, lumber, all weighted equally, hollow tile ½, and structural and reinforcing steel, together weighted ½. These wages and prices are reported by 12 district offices of the Associated General Contractors, from Atlanta, Baltimore, Boston, Chicago, Cincinnati, Cleveland, Detroit, Los Angeles, New York, Philadelphia, St. Louis and San Francisco. Reported monthly.

Boeckh Index—(see table for 16 cities on page C-14). Computed by E. H. Boeckh & Associates, Inc., Cincinnati, O., as of the first of each month, from basic cost data on materials obtained for most part from local building trade papers. Prevailing wage rates are obtained from contractors. Actual rather than nominal rates for both skilled and common labor are used. An arbitrary labor efficiency correction is used based on study of labor conditions in each area. Weights are based on studies of actual building costs, and vary with the different types of structures. Reported monthly.

Fruin-Colnon Index — Represents building index number for St. Louis determined by this contractor's actual and estimated costs of material and labor on an industrial plant consisting of five buildings in St. Louis.

George A. Fuller Index—Based on composite of three commercial type buildings, 1913 = 100. Index computed by repricing 36 major cost elements including mechanicals, elevators, wiring, heating and ventilating. Computed monthly.

Turner Index—Compiled by Turner Construction Co., New York for eastern cities, is based on actual costs encountered on its own building construction work. These factors are considered: labor rates; materials prices; productivity of labor; efficiency of plant and management; competitive conditions. Computed periodically.

Tuttle Index—Represents costs of general building, both industrial and architectural, in the east. This index was not computed from June, 1933 until Feb. 1934. It was resumed Mar. 1, 1934 by re-computing cost of 1932 building on basis of 1934 cost experience, and determining relative

American Appraisal Company Construction Cost Trend Index — 1913 = 100

For average of four types of buildings: all Frame, Brick Wood Frame, Brick Steel Frame and Reinforced Concrete.

These indices cover structural items only, and do not include factors for Plumbing, Heating, Lighting, Elevators, etc.

	1913	'14	'15	'16	'17	'18	'19	'20	'21	'22	'23	'24	'25	'26	'27	'28	'29	'30	'31	'32	'33	'34	'35	'36	'37
U. S. AVERAGE (30 Cities)	**100**	**98**	**101**	**116**	**144**	**172**	**213**	**270**	**205**	**189**	**212**	**210**	**203**	**206**	**206**	**205**	**206**	**199**	**171**	**152**	**146**	**157**	**157**	**163**	**181**
Twenty-Two Typical Cities:																									
BOSTON	100	100	103	118	149	176	214	270	208	196	218	215	211	210	208	209	211	212	187	164	159	165	164	169	192
NEW YORK	100	99	100	115	142	167	204	277	227	203	228	223	214	217	218	218	220	219	190	164	161	169	168	172	189
BUFFALO	100	98	99	115	144	173	211	260	196	184	214	211	204	205	203	200	199	194	171	152	146	154	153	157	182
BALTIMORE	100	97	99	116	150	187	222	274	204	196	222	208	215	212	214	216	217	209	178	162	154	163	169	174	185
PHILADELPHIA	100	98	102	115	145	176	220	286	210	191	221	218	213	214	215	215	216	204	179	158	153	162	161	164	178
PITTSBURGH	100	96	99	115	142	172	213	273	208	192	215	224	220	222	223	222	222	215	191	168	156	165	163	169	192
CINCINNATI	100	98	100	115	143	167	202	262	201	184	210	209	208	208	208	207	209	198	169	153	147	157	158	167	190
CLEVELAND	100	97	99	120	149	174	217	288	216	200	229	231	224	222	219	220	220	215	183	156	147	160	162	169	193
CHICAGO	100	97	100	116	141	165	209	280	216	193	217	212	212	209	211	211	211	207	180	158	152	162	165	173	188
INDIANAPOLIS	100	102	104	119	146	170	206	266	210	192	215	216	212	209	212	214	213	208	177	153	148	157	157	162	184
DETROIT	100	99	102	122	150	181	227	288	209	190	215	215	214	213	210	209	208	202	167	145	143	153	156	162	187
MILWAUKEE	100	100	103	120	150	173	221	276	202	186	214	213	207	207	208	209	208	196	158	141	137	152	159	171	192
MINNEAPOLIS	100	98	100	114	142	166	202	264	200	184	203	198	191	187	188	188	188	182	159	145	143	149	150	156	183
KANSAS CITY	100	98	102	120	150	175	215	260	205	196	215	212	205	204	200	198	198	191	169	151	144	155	157	160	181
ST. LOUIS	100	97	100	114	141	168	207	265	210	190	214	222	217	215	211	210	209	204	180	157	151	160	158	162	186
ATLANTA	100	97	98	111	140	180	231	287	206	190	213	204	198	200	202	203	204	191	166	142	138	157	159	163	177
DALLAS	100	100	105	121	145	171	213	261	199	183	200	197	190	195	195	194	193	186	163	143	136	145	145	148	159
NEW ORLEANS	100	96	96	112	136	169	224	269	207	192	215	216	206	207	208	206	206	195	161	142	138	155	155	160	173
DENVER	100	100	102	118	144	165	201	248	195	181	192	196	194	193	187	194	196	190	162	145	138	146	147	151	175
SEATTLE	100	96	101	115	141	171	209	254	188	179	198	196	192	189	185	185	188	181	154	138	133	146	150	155	179
SAN FRANCISCO	100	97	104	118	139	164	201	246	195	181	199	190	186	179	179	179	182	178	154	141	135	141	141	151	166
LOS ANGELES	100	97	102	112	133	159	201	242	200	191	205	196	189	188	186	186	189	176	153	139	132	138	137	139	156

NOTE.— These construction cost index figures are based on 1913 as 100% for each individual location, thus indicating the trend in each city and not the trend between the various locations. The index figures are calculated on the basis of normal average material prices, average labor wages, and the market conditions in the individual cities and do not reflect extremes such as premium prices and overtime wages for rush work during boom periods or the " extreme low " of cut throat practices during the "depression periods."

change in cost. It is re-computed periodically as warranted.

Consolidated Engineering Co. Index—Composite index of construction costs in Baltimore of closed shop and of open shop building contractors. Baltimore is unusual in that 90 per cent of contractors work on an open shop basis and do about 80 per cent of the construction business. The index is a composite of all types of buildings. The labor wage component of this index fluctuates with supply and demand in the open shop work, and the predominence of this class of work causes a greater fluctuation in the composite index than if closed shop predominated with fixed wages for contract periods. This index was established in 1911, with values prior to that year computed.

Prior to 1913, values by years are:

1860-1880 = 63   1900-1913 = 87.5
1880-1900 = 70   1900   = 75.1

1901	76.3	1905	85.6	1909	93.4
1902	79.2	1906	92.4	1010	99.0
1903	81.6	1907	96.7	1911	96.9
1904	82.1	1908	91.3	1912	97.6

Monthly values are computed.

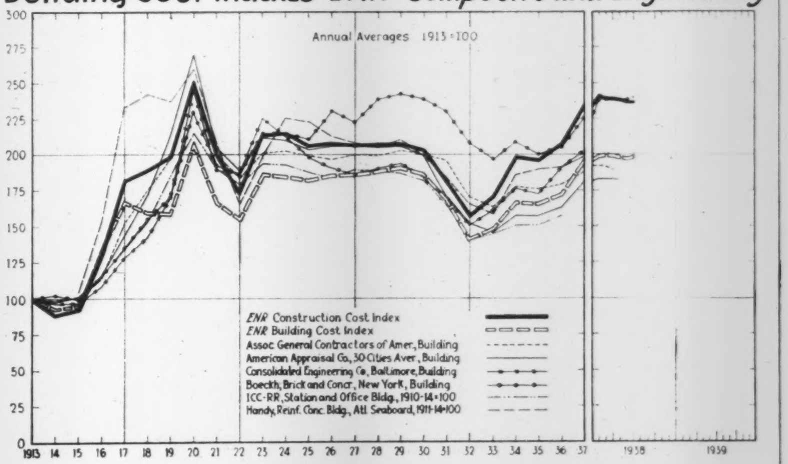
Handy Public Utility Index—Compiled by Whitman, Requardt and Smith, consulting engineers, Baltimore, for 5 geographic divisions of the United States. First published in *Electrical World*, April 14, 1923 and *Gas Age Record*, Oct. 13, 1923. Prices of basic materials: cement, sand, stone, cast iron pipe, wire, are obtained from *Engineering News-Record, Iron Age* and other sources, and checked where possible against prices actually paid. Labor cost trends are from such sources as U. S. Department of Labor and National Association of Builders Exchanges. Mechanical and electrical equipment prices and trends are from nationally known manufacturers. These prices of materials, labor and equipment are reduced to indexes, 1911 = 100. Items of more recent development are based upon a later year. Proportions of basic materials, labor and equipment, determined by analyses of many millions of dollars' worth of plant and construction, develop the weights applied to materials, labor and equipment indexes to obtain the composite indexes reported. Computed January 1 and July 1.

Building Cost Indexes

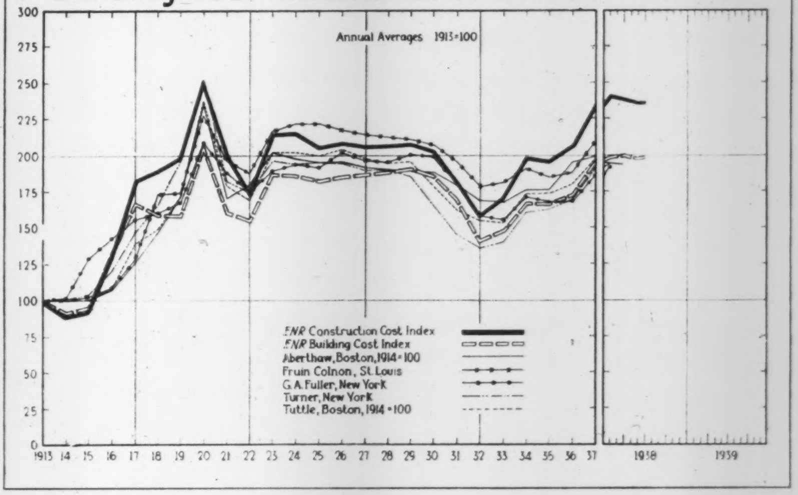
Year	AGC	Boeckh New York*	Consol. Engr.	Aber-thaw	Fruin-Colnon	Fuller	Turner	Tuttle
1913	100	100	100	.....	100	100	100	.....
1914	99	102	97.7	100	100	101.5	100	100
1915	100	99	97.7	100	102	129.5	103	100
1916	114	116	108.1	107	108	143	120	108
1917	152	135	128.1	126	128	156	147	139
1918	175	155	143.1	147	173	160	166	149
1919	198	171	170.8	172	174	168	196	172
1920	247	230	247.1	234	227	209	252	237
1921	200	193	189.0	170	197	188	183	179
1922	184	186.5	187.1	179	188	175	175	170
1923	201	215	226.7	202	217	190	196	202
1924	202	215	213.8	198	223	194	194	202
1925	199	211	198.5	195	222	193	195	200
1926	197	230	191.6	196	218	202	195	204
1927	200	223	186.6	193	214	197	190	198
1928	199	238	190.3	191	213	196	190	195
1929	203	242	194.8	189	211	201	185	196
1930	200	238	184.7	188	207	199	165	178
1931	196	230	170.9	179	196	180	145	162
1932	171	208	150.8	169	178	157	136	155
1933	163	197	160.9	168	181	155	140	153.5
1934	178	209	176.6	176	191	171	160	173
1935	176	200	173.0	176.5	185	167	162	173
1936	179	205	191.7	195	187.5	168	169	180
1937	188	226	202.8	199.4	210	186.5	192	198.5

* Brick and concrete building, New York, series converted to 1913 = 100.

Building Cost Indexes-*ENR-Composite and Engineering*



Building Cost Indexes - *ENR and Contractor*



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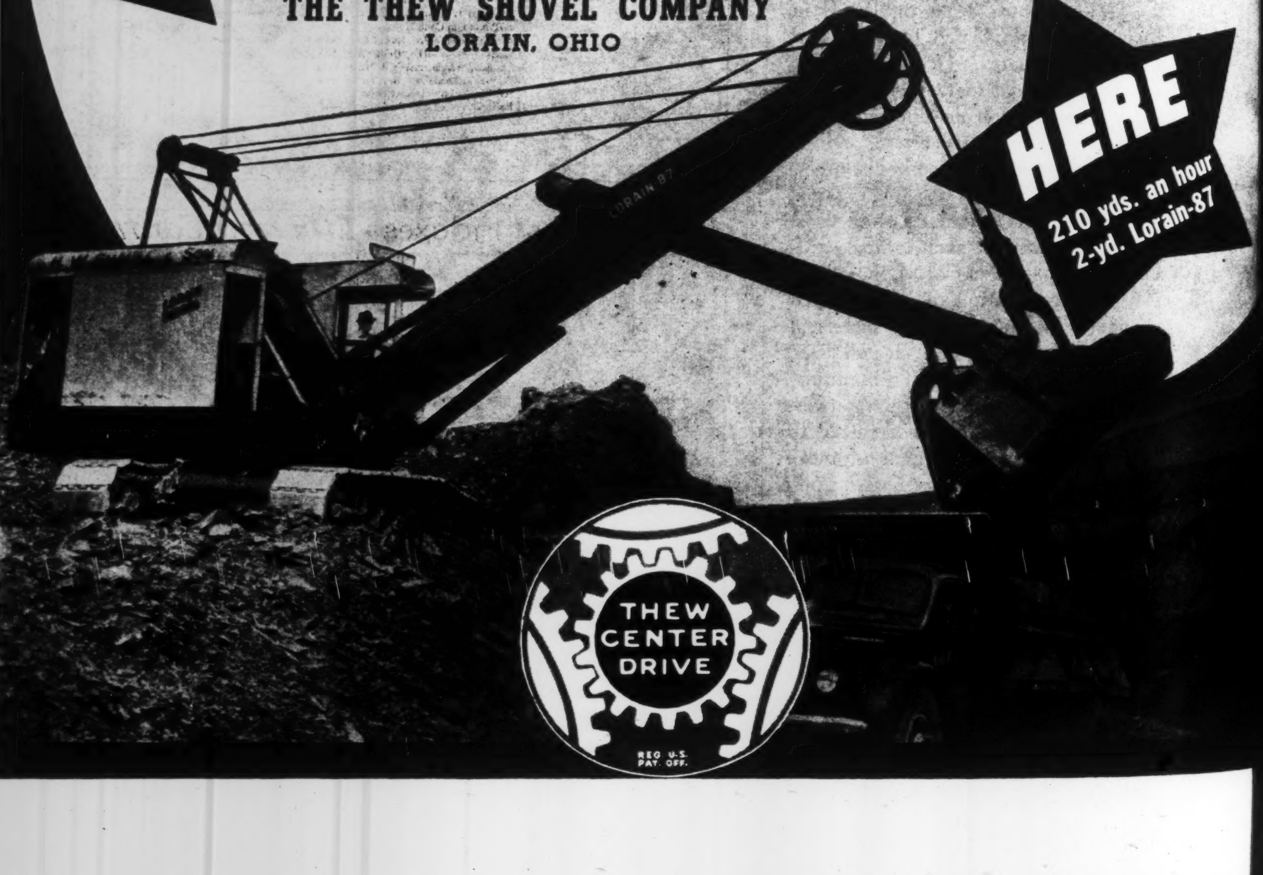
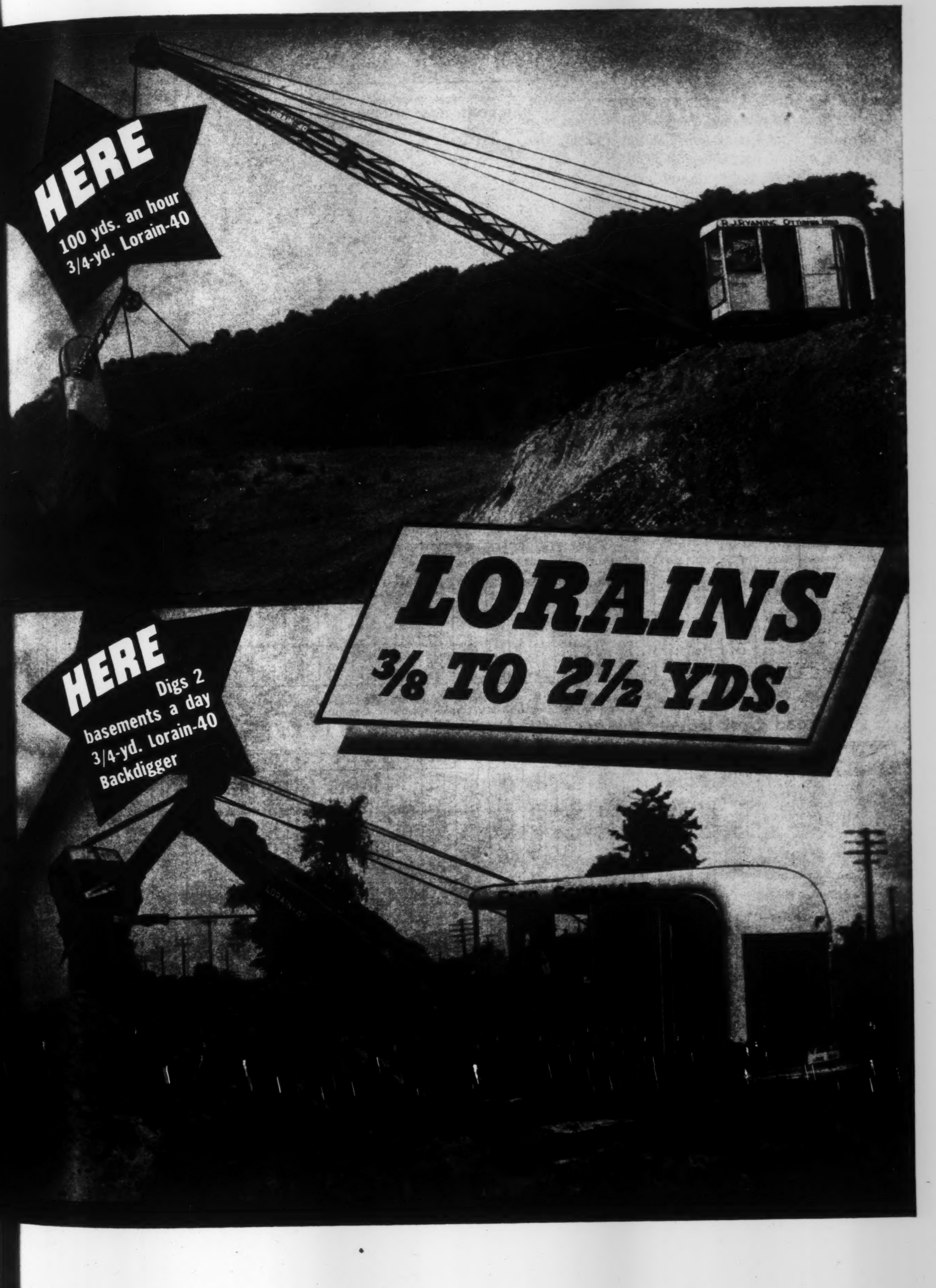


THEW CENTER DRIVE
REG. U.S. PAT. OFF.



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100 yds. an hour
3/4-yd. Lorain-40

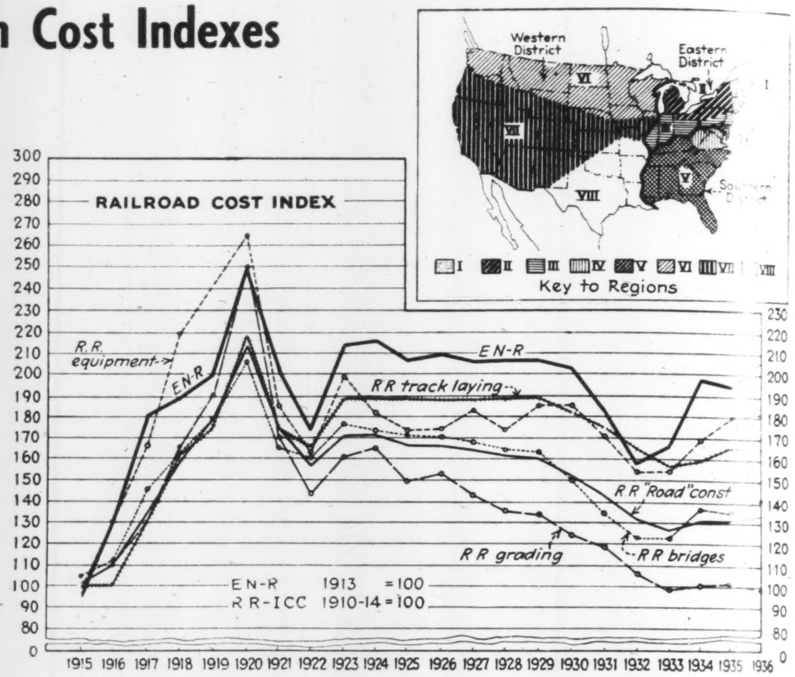
LORAINS
3/8 TO 2½ YDS.

HERE
Digs 2
basements a day
3/4-yd. Lorain-40
Backdigger

LORAIN-40
LORAIN-40

Railroad Construction Cost Indexes

These indexes by Engineering Section, Bureau of Valuation, Interstate Commerce Commission, include items such as grading, tunnel excavation, bridges, ballast haul, track-laying and surfacing, developed from analysis of major construction contracts over a period of 30 years and from joint studies made with various sub-committees of Presidents' Conference Committee. Indexes shown for material accounts such as ties, rails, other track material, ballast and fences are based on studies of carriers' returns to Valuation Order 14, joint studies made with various sub-committees of Presidents' Conference Committee, well-known engineering and trade publications, contracts covering major construction projects over a period of 30 years, and other information furnished by individual carriers.



Railroad Cost Indexes for Regions by Years for "Load" Construction — 1910-14 = 100

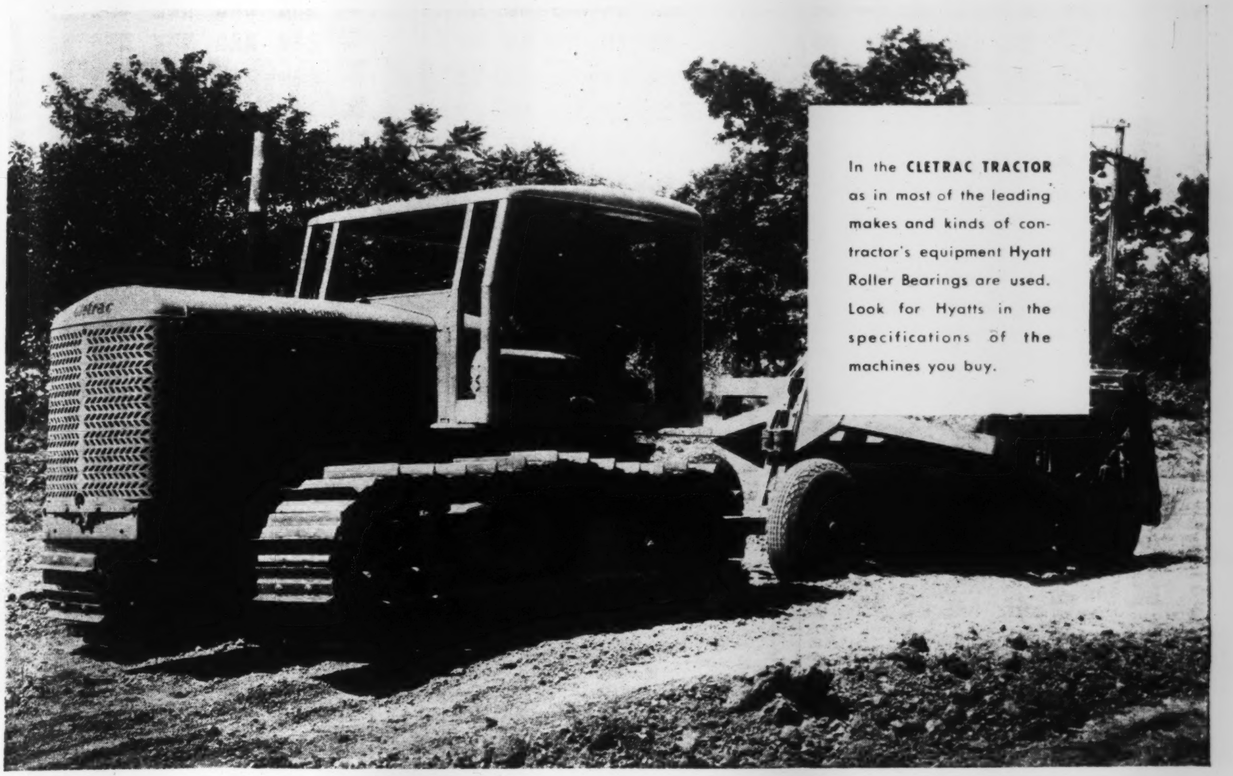
Total of Accounts 1-46, ROAD, Engineering Section, Bureau of Valuation, Interstate Commerce Commission, July 1, 1937

United States	Per Cent	Index by Years																					
		1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936
Reg. I to VIII...	**73.09**	**101**	**110**	**134**	**159**	**178**	**214**	**175**	**157**	**171**	**171**	**166**	**166**	**164**	**161**	**160**	**152**	**143**	**131**	**127**	**131**	131	133
Reg. I..........	75.36	103	112	138	162	184	220	178	163	177	178	172	173	171	167	166	158	146	134	131	133	134	136
Reg. II..........	68.15	102	111	134	160	180	214	176	160	174	174	168	168	167	165	164	157	145	133	130	134	134	136
Reg. III........	67.99	102	111	135	160	180	214	176	160	173	173	169	168	167	164	163	155	143	132	129	133	133	136
Reg. IV.........	70.49	101	110	132	157	180	214	173	152	167	166	164	163	159	155	154	145	133	126	122	125	126	127
Reg. V..........	76.66	101	109	133	158	179	218	171	153	168	167	163	164	160	156	156	148	137	129	125	129	128	131
Reg. VI.........	77.41	102	110	133	157	177	215	175	155	169	170	163	164	162	158	158	150	138	129	125	128	128	129
Reg. VII........	75.62	100	109	131	157	175	212	177	158	170	170	165	166	163	160	158	151	139	131	128	130	129	131
Reg. VIII.......	78.15	105	109	133	160	176	208	173	157	171	171	166	167	164	161	161	154	143	133	130	133	134	135

(Indexes represent territorial index factors and are not necessarily applicable for determining unit reproduction costs upon individual roads.)

Railroad Cost Indexes by Accounts Applicable to Entire U. S., Regions I to VIII, Incl.

"Road" Construction	1915	'16	'17	'18	'19	'20	'21	'22	'23	'24	'25	'26	'27	'28	'29	'30	'31	'32	'33	'34	'35	'36
Engineering............	101	110	134	159	178	214	175	157	171	171	166	166	164	161	160	152	143	131	127	131	131	133
Grading................	100	110	130	165	190	250	170	143	160	164	149	153	143	135	133	123	118	106	98	100	101	99
Undergr'd Power Tubes..	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	...	...
Tunnels and Subways....	103	109	128	150	183	208	179	165	179	179	179	178	169	155	155	143	130	119	111	122	120	125
Bridges, Culverts, etc....	105	111	146	162	178	206	165	160	176	173	171	170	168	164	163	150	134	122	122	136	135	141
Elevated Structures......	102	124	169	177	184	210	150	153	173	171	168	165	163	163	162	154	144	129	122	136	136	137
Ties....................	100	100	112	133	170	201	189	157	177	175	172	173	175	176	175	170	155	144	139	149	147	150
Rails...................	101	106	121	148	152	168	158	144	145	145	144	144	144	144	144	144	144	140	134	123	123	124
Other Track Material....	99	129	198	210	203	209	192	161	182	179	177	177	177	177	170	169	165	163	158	150	147	150
Ballast.................	103	107	114	140	150	207	191	176	175	175	174	175	176	176	176	168	159	146	146	141	139	140
Track Laying & Surfacing.	100	100	130	163	175	218	174	165	188	188	188	188	188	188	188	182	175	164	157	159	165	165
Right-of-way Fences.....	100	122	142	178	194	204	189	177	179	179	176	175	175	175	173	171	164	147	135	140	140	138
Snow, Sand Fences, Sheds.	103	108	119	165	199	280	197	194	212	200	201	201	204	204	204	198	188	125	126	140	140	140
Crossings and Signs......	104	108	137	161	182	208	171	164	178	175	171	169	166	165	165	161	153	131	127	139	137	139
Station and Office Bldgs..	101	115	135	154	185	215	192	180	194	193	188	184	189	188	187	182	165	141	145	151	151	157
Roadway Buildings......	100	115	136	156	185	216	192	178	196	196	189	187	192	191	190	186	166	140	145	150	150	150
Water Stations..........	101	120	159	170	191	213	185	178	187	187	186	182	185	186	184	177	161	147	151	155	155	156
Fuel Stations............	101	120	153	160	190	212	181	166	185	185	182	180	183	183	183	174	159	144	149	154	154	153
Shops and Enginehouses..	102	118	141	159	188	216	191	180	193	192	188	185	189	188	187	176	161	137	142	147	147	155
Grain Elevators..........	100	110	128	150	185	214	190	184	197	197	193	190	195	193	193	182	165	137	142	147	147	156
Storage Warehouses......	100	115	135	155	185	210	193	178	198	198	193	189	193	191	191	184	165	137	142	147	147	154
Wharves and Docks......	100	114	133	152	178	204	167	158	175	175	174	177	178	178	178	172	158	136	141	146	146	149
Coal and Ore Wharves ..	101	117	145	155	184	204	170	159	176	176	174	174	176	176	176	172	157	136	142	147	147	151
Gas Producing Plants....	108	122	148	175	194	213	194	176	188	189	186	185	188	189	189	178	163	145	148	179	179	178
Telegraph & Teleph. Lns.	103	124	147	158	164	192	191	162	187	179	163	157	163	165	165	150	138	121	119	125	131	131
Signals and Interlockers..	94	106	132	152	165	175	163	158	165	164	162	169	158	155	154	147	138	130	130	133	136	138
Pwr Dams, Cnls, Pipe Lns	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	...	151
Pwr Plant Buildings.....	104	122	141	158	189	218	197	184	196	196	191	186	191	191	189	177	162	138	143	148	148	152
Pwr Substa Bldgs........	101	117	137	156	187	218	194	180	197	197	192	188	193	191	190	176	161	137	142	147	147	138
Pwr Transmn Sys........	115	166	190	181	186	176	145	132	142	136	140	141	137	142	150	136	116	98	98	103	105	108
Pwr Dist Sys............	109	148	178	192	189	205	172	163	178	172	175	176	175	178	181	173	148	144	144	148	151	152
Pwr Line Poles, Fixtrs....	106	116	145	169	194	230	208	179	209	203	185	183	198	199	209	200	172	147	147	150	153	148
Underground Conduits...	101	110	119	172	206	250	228	214	220	215	220	216	219	219	217	215	175	175	175	180	184	185
Misc. Structures.........	101	117	137	156	186	217	192	179	195	195	190	186	191	190	189	182	164	141	146	151	151	154
Paving..................	104	124	153	177	205	217	191	190	191	191	191	190	190	190	190	190	181	156	150	145	145	145
Roadway Machines......	105	113	127	146	158	170	162	149	151	151	151	151	151	149	148	147	144	138	138	147	147	149
Roadway Small Tools....	100	100	179	179	184	202	181	170	173	185	190	190	191	191	190	160	155	155	150	150	150	160
Shop Machinery..........	115	126	155	192	200	210	198	173	183	185	185	186	187	189	191	176	166	155	155	179	179	179
Power Plant Machinery...	115	126	155	192	200	210	198	173	183	185	185	186	187	189	191	176	166	155	155	179	179	193
Power Substation Appar..	115	126	155	192	200	210	198	173	183	185	185	186	187	189	191	176	166	155	155	179	179	145



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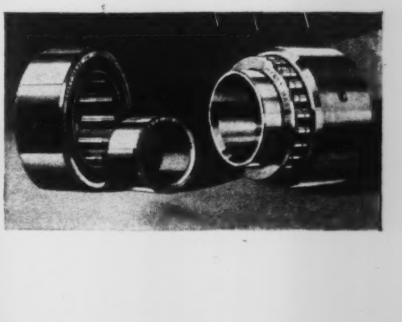


PUBLIC UTILITY CONSTRUCTION COST INDEX

Compiled and published by Whitman, Requardt and Smith, Consulting Engineers, Baltimore, Md., for the Estate of William W. Handy

Table No. 1 Cost Trends of Building Construction, 1911 to 1914 = 100

(Complete Index reports 13 items entering into Building Construction Costs)

COST INDEX NUMBERS

Classes of Construction, Material and Labor Elements	1916	1917	1918	Jan. 1 1919	Jan. 1 1920	July 1 1920	Nov. 1 1920	Jan. 1 1921	Sept. 1 1921	Feb. 1 1922	Jan. 1 1923	Jan. 1 1924	July 1 1924	Jan. 1 1925	July 1 1925	Jan. 1 1926	July 1 1926	Jan. 1 1927	July 1 1927	Jan. 1 1928	July 1 1928	Jan. 1 1929	July 1 1929	Jan. 1 1930	July 1 1930	Jan. 1 1931	July 1 1931	Jan. 1 1932	July 1 1932	Jan. 1 1933	July 1 1933	Jan. 1 1934	July 1 1934	Jan. 1 1935	July 1 1935	Jan. 1 1936	July 1 1936	Jan. 1 1937	July 1 1937	Jan. 1 1938
Atlantic Seaboard Division																																								
Reinforced Concrete	153	233	242	237	238	274	269	233	182	165	199	227	224	221	216	213	213	214	203	204	206	209	212	205	194	189	179	171	159	153	165	178	194	191	189	191	192	199	216	214
Brick	141	192	212	220	246	279	278	245	207	188	215	237	232	230	229	228	229	230	223	224	217	219	220	212	207	203	194	189	173	166	175	189	200	195	194	197	197	203	218	217
North Central Division																																								
Reinforced Concrete	153	230	230	220	220	270	263	228	181	163	193	219	214	212	208	203	201	205	194	195	197	200	203	199	190	185	177	189	154	151	162	175	186	182	182	186	187	196	209	209
Brick	140	189	198	199	224	272	269	238	201	181	206	225	218	216	215	212	211	214	208	209	201	203	205	199	195	192	186	181	164	161	170	183	190	185	184	188	189	197	207	208
South Central Division																																								
Reinforced Concrete	155	232	236	224	224	268	263	229	181	160	191	213	206	203	196	192	191	194	186	186	188	191	193	187	179	176	159	149	144	140	148	160	173	179	173	175	177	187	200	198
Brick	142	191	204	203	228	271	270	240	224	181	206	221	211	208	205	203	204	205	201	202	195	197	198	190	185	183	168	160	154	151	157	171	179	182	175	178	180	186	198	197
Plateau Division																																								
Reinforced Concrete	151	232	234	221	220	260	256	221	181	164	192	215	208	208	201	198	197	199	188	189	191	194	196	190	180	177	166	153	149	146	156	168	178	174	172	176	180	188	206	203
Brick	139	191	203	202	226	264	264	232	203	185	207	223	214	214	211	211	210	211	205	205	199	200	201	193	187	184	175	167	163	160	168	182	187	182	181	182	185	191	206	204
Pacific Division																																								
Reinforced Concrete	151	230	233	220	225	266	259	226	187	165	191	212	205	203	196	191	190	196	185	185	188	191	194	188	178	175	165	157	148	145	153	166	177	174	173	175	178	186	200	199
Brick	138	189	201	199	229	268	265	234	207	185	204	217	206	205	201	198	197	203	197	197	190	192	194	186	180	177	169	164	156	154	156	170	177	172	173	176	179	185	198	197

Table No. 2 Cost Trends of Gas Plant Construction, 1911 = 100

(Complete Index reports 17 items entering into Gas Plant Construction Costs)

COST INDEX NUMBERS

Classes of Construction, Material, Equipment and Labor Elements	1913	1914	1915	1916	1917	1918	Jan. 1 1919	Jan. 1 1920	July 1 1920	Jan. 1 1921	Sept. 1 1921	Jan. 1 1923	Jan. 1 1924	July 1 1924	Jan. 1 1925	July 1 1925	Jan. 1 1926	July 1 1926	Jan. 1 1927	July 1 1927	Jan. 1 1928	July 1 1928	Jan. 1 1929	July 1 1929	Jan. 1 1930	July 1 1930	Jan. 1 1931	July 1 1931	Jan. 1 1932	July 1 1932	Jan. 1 1933	July 1 1933	Jan. 1 1934	July 1 1934	Jan. 1 1935	July 1 1935	Jan. 1 1936	July 1 1936	Jan. 1 1937	July 1 1937	Jan. 1 1938
Atlantic Seaboard Division																																									
Total Construction and Equipment	108	107	112	136	186	229	239	253	279	265	205	224	241	238	234	229	230	230	226	223	215	216	216	219	218	216	214	208	202	188	176	178	189	216	216	217	218	218	225	246	246
Mech. Equip. Excl. of Gas Holders	100	104	108	138	195	233	219	222	241	248	201	194	220	218	217	213	212	212	216	211	208	209	213	221	224	222	219	217	209	195	192	199	216	230	232	234	240	240	252	277	277
North Central Division																																									
Total Construction and Equipment	103	102	109	131	180	203	210	221	257	248	201	206	226	224	220	217	217	218	214	211	204	205	204	206	207	208	207	203	198	178	182	185	196	203	202	203	208	208	219	235	237
Mech. Equip. Excl. of Gas Holders	100	104	108	138	195	233	219	222	241	248	201	194	220	218	217	213	212	212	216	211	208	209	213	221	224	222	219	217	209	195	192	199	216	230	232	234	240	240	252	277	277
South Central Division																																									
Total Construction and Equipment	103	102	114	145	182	213	214	223	251	246	203	196	214	210	205	199	199	200	198	195	187	187	187	190	188	187	185	177	171	160	158	167	177	184	195	196	202	202	208	223	222
Mech. Equip. Excl. of Gas Holders	100	104	108	138	195	233	219	222	241	248	201	194	220	218	217	213	212	212	216	211	208	209	213	221	224	222	219	217	209	195	192	199	216	230	232	234	240	240	252	277	277
Plateau Division																																									
Total Construction and Equipment	103	103	107	128	180	207	207	214	234	231	194	193	210	206	206	201	202	202	198	195	187	189	189	191	189	188	186	181	176	166	170	173	184	191	190	190	195	195	202	221	221
Mech. Equip. Excl. of Gas Holders	100	104	108	138	195	233	219	222	241	248	201	194	220	218	217	213	212	212	216	211	208	209	213	221	224	222	219	217	209	195	192	199	216	230	232	234	240	240	252	277	277
Pacific Division																																									
Total Construction and Equipment	104	102	107	128	180	207	209	228	255	248	212	203	219	215	211	206	205	206	206	203	196	197	197	201	200	198	197	191	187	177	180	178	189	196	195	197	198	203	210	228	228
Mech. Equip. Excl. of Gas Holders	100	104	108	138	195	233	219	222	241	248	201	194	220	218	217	213	212	212	216	211	208	209	213	221	224	222	219	217	209	195	192	199	216	230	232	234	240	240	252	277	277

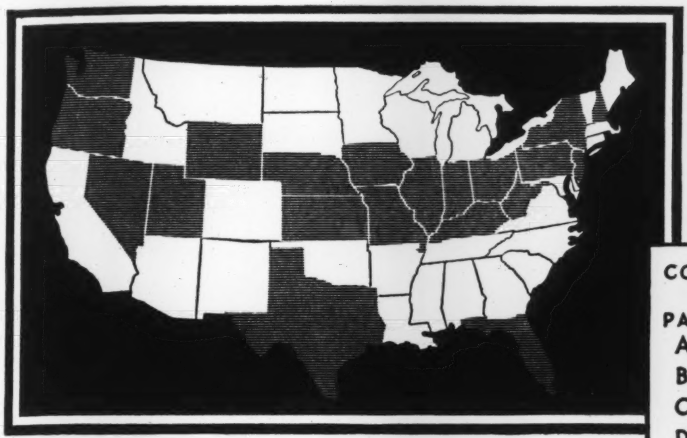
Table No. 3 Cost Trends of Electric Light and Power Construction, 1911 = 100

(Complete Index reports 50 items entering into Electric Light and Power Construction Costs)

COST INDEX NUMBERS

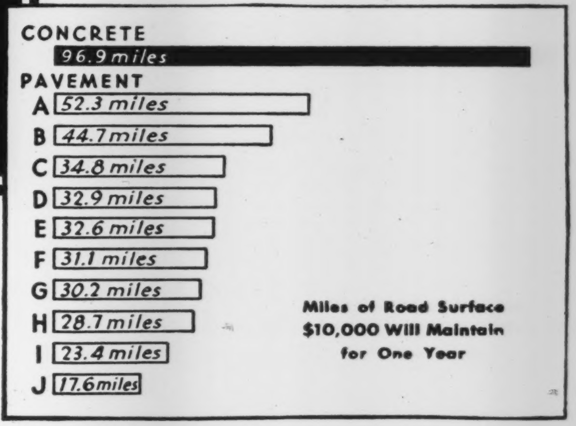
Classes of Construction, Material, Equipment and Labor Elements	1914	1915	1916	1917	1918	Jan. 1 1919	Jan. 1 1920	July 1 1920	Jan. 1 1921	Sept. 1 1921	Jan. 1 1923	Jan. 1 1924	July 1 1924	Jan. 1 1925	July 1 1925	Jan. 1 1926	July 1 1926	Jan. 1 1927	July 1 1927	Jan. 1 1928	July 1 1928	Jan. 1 1929	July 1 1929	Jan. 1 1930	July 1 1930	Jan. 1 1931	July 1 1931	Jan. 1 1932	July 1 1932	Jan. 1 1933	July 1 1933	Jan. 1 1934	July 1 1934	Jan. 1 1935	July 1 1935	Jan. 1 1936	July 1 1936	Jan. 1 1937	July 1 1937	Jan. 1 1938
Atlantic Seaboard Division																																								
Total Construction and Equipment	102	106	132	160	192	202	208	226	221	183	189	201	196	201	197	197	194	193	187	192	192	195	206	204	188	191	188	182	176	170	177	186	200	200	199	204	205	213	230	226
Electric Plant — Steam	102	106	119	132	160	187	196	206	216	194	186	195	192	199	196	197	196	194	190	193	192	200	208	206	198	198	195	192	186	182	186	200	205	205	204	205	209	210	229	226
Sub-Station Equipment	102	105	111	130	161	178	175	197	201	182	176	187	186	191	190	184	178	176	172	173	173	170	181	179	174	177	175	172	168	165	166	172	184	184	184	185	187	188	204	204
North Central Division																																								
Total Construction and Equipment	100	105	129	154	178	184	189	214	210	176	179	193	189	194	192	190	187	187	182	186	186	189	199	199	184	188	187	186	174	172	179	187	195	195	194	199	199	209	224	222
Electric Plant — Steam	100	102	112	123	145	163	172	188	197	179	171	185	185	189	189	189	188	188	185	188	187	195	202	203	195	197	199	199	186	186	189	203	204	203	202	204	205	209	227	225
Sub-Station Equipment	100	102	104	122	145	155	151	180	184	167	162	178	179	182	184	178	171	171	168	169	169	167	177	176	172	177	179	181	169	169	171	176	184	184	184	184	184	187	204	203
South Central Division																																								
Total Construction and Equipment	100	107	130	157	183	188	193	218	216	183	182	193	186	189	186	184	183	182	179	183	186	189	199	197	185	186	183	179	171	169	179	187	195	198	193	199	201	208	224	221
Electric Plant — Steam	100	104	114	127	152	169	178	197	210	188	181	190	186	189	188	187	189	187	186	189	195	202	210	209	205	204	203	200	190	189	198	211	212	212	203	208	212	214	234	232
Sub-Station Equipment	100	103	107	125	152	160	157	189	195	176	172	182	181	181	181	175	171	170	169	170	176	174	184	182	182	184	183	181	173	173	179	185	192	192	184	188	191	192	211	210
Plateau Division																																								
Total Construction and Equipment	100	103	128	155	183	187	189	211	209	178	179	192	186	191	191	190	188	186	181	185	185	188	198	197	181	183	181	177	171	169	179	188	196	196	195	198	198	206	225	221
Electric Plant — Steam	100	101	114	125	153	171	175	192	202	188	178	191	189	191	194	197	196	194	190	193	193	200	208	207	199	198	197	194	188	188	197	211	212	211	210	210	210	212	234	232
Sub-Station Equipment	100	100	106	124	154	162	154	184	187	173	168	184	183	184	188	185	177	176	172	173	173	171	182	179	175	177	177	175	171	171	177	183	191	191	191	189	189	189	210	209
Pacific Division																																								
Total Construction and Equipment	100	103	127	156	178	182	194	214	214	185	178	187	182	185	182	180	178	181	175	180	179	182	192	191	176	178	175	172	163	161	170	178	189	189	192	196	197	204	221	218
Electric Plant — Steam	100	101	111	127	145	161	179	192	206	191	172	180	178	180	178	178	177	182	178	181	180	187	195	193	186	186	185	182	170	170	178	191	198	197	203	204	204	206	226	223
Sub-Station Equipment	100	100	104	125	146	153	160	184	193	180	163	174	173	174	173	167	161	165	162	163	163	161	171	168	165	167	166	164	155	155	161	166	179	179	184	185	185	186	204	203

THE MAINTENANCE RECORDS *Speak!*



Official records from the states shown in gray are the basis for the Portland Cement Association's newest summary of surface maintenance costs.

To concrete's overwhelming public preference; to its greater load-carrying capacity per dollar of first cost; to its non-skid, highly visible "safety" surface, add this record of maintenance economy as one more reason for building your roads of concrete.



Concrete saves $88 to $465 per year per mile in surface maintenance, according to most complete summary ever published

What percentage of future road funds must be earmarked for surface maintenance?

How much will be available for urgently needed new construction?

Additional light is thrown on these fundamental questions by a new summary of surface maintenance costs, just published by the Portland Cement Association. This comprehensive study includes all states which release upkeep costs in sufficient detail so that surface maintenance costs can be segregated. There is no selection or exclusion of data.

All Available Records Included

The summary is based on detailed surface maintenance figures from official records of 21 state highway departments. Figures include the latest and all records available.

The periods covered in the various states range from 2 to 16 consecutive years, averaging about 9 years.

134,856 miles of state highways are included—nearly half of the surfaced mileage of state trunk systems, representing a wide range of traffic, subgrade, climatic and other conditions.

Concrete's Economy Clearly Shown

Average surface maintenance costs on 49,000 miles of concrete (over 321,500 year-miles of maintenance) were found to be $103.17 per mile per year.

The average cost on the next lowest paving material was $191.09, nearly double the cost on concrete. This was on a small mileage, much of which was comparatively new. The average surface maintenance cost on all surfaces other than concrete was $359.89, three and one-half times that on the concrete.

Here are the actual figures for the principal road types:

Type of Pavement	Total Mileage	Aver. Surface Maintenance Cost Per Mile Per Year
Concrete	49,336.8	$103.17
A	2,183.4	191.09
B	1,135.5	223.47
C	2,284.3	287.70
D	20,566.9	304.32
E	25,961.2	306.83
F	11,831.4	321.92
G	1,838.2	331.52
H	3,023.6	348.02
I	7,778.9	427.17
J	4,770.4	568.32

Mail the coupon or write for detailed figures.

PORTLAND CEMENT ASSOCIATION
Dept. A6e-17, 33 West Grand Avenue, Chicago, Ill.

Please send me, "Road Surface Maintenance Costs from 21 States."

Name

Address

City *State*

Boeckh Index of Construction Costs — U. S. Average, 1929=100

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc.
ATLANTA AREA										
1926-29	82.7	87.0	84.2	83.7	87.0	82.9	94.5	84.7	87.5	86.8
1913	41.2	43.7	42.4	43.3	45.6	40.6	45.2	43.0	44.3	43.0
1914	39.5	42.2	40.8	42.2	43.9	38.7	44.1	41.4	43.4	42.1
1915	41.0	43.6	42.0	43.3	44.7	40.1	44.3	42.8	43.7	43.8
1916	46.0	48.9	48.9	52.6	55.5	44.8	66.9	48.4	57.6	53.8
1917	54.4	57.2	56.6	63.7	69.4	46.0	90.6	56.6	74.4	63.9
1918	71.3	74.8	72.7	74.6	80.1	69.7	93.2	72.4	80.7	75.4
1919	103.6	105.1	100.6	87.0	95.0	105.5	95.3	96.1	90.9	86.5
1920	137.1	139.6	133.1	110.6	119.6	140.6	111.8	129.6	108.5	111.0
1921	85.1	88.1	83.9	81.9	84.0	84.5	75.6	82.2	76.8	84.0
1922	83.4	85.8	81.8	79.6	82.2	83.6	73.1	79.5	74.6	80.6
1923	88.6	92.8	89.1	88.9	91.5	88.3	86.7	88.0	86.1	91.9
1924	85.0	89.8	89.2	91.1	91.9	88.8	88.8	88.3	89.8	94.7
1925	81.7	86.5	85.6	88.6	88.6	85.3	89.4	85.1	83.4	92.5
1926	83.1	87.1	83.7	85.1	86.4	82.1	93.4	84.5	86.6	85.1
1927	82.4	85.9	83.6	83.2	84.6	81.8	96.5	84.2	85.5	85.6
1928	85.6	89.4	86.7	86.0	87.9	84.8	93.3	85.7	88.5	86.6
1929	79.7	85.6	82.8	80.5	88.2	82.9	94.8	84.4	89.4	89.9
1930	80.9	85.3	82.8	84.5	85.7	78.2	91.8	83.6	83.6	86.1
1931	78.6	82.8	80.2	80.4	80.4	77.2	82.2	81.6	80.4	82.1
1932	71.0	75.2	73.6	77.2	77.0	68.7	80.8	77.4	78.1	78.3
1933	64.6	69.6	68.3	77.9	76.1	62.7	79.5	71.8	79.0	82.0
1934	70.6	76.6	74.6	83.8	83.4	68.9	91.5	78.5	86.4	87.4
1935	68.4	72.4	73.2	83.9	82.6	64.9	89.7	77.7	85.6	87.6
1936	68.4	72.4	73.2	84.4	83.3	65.8	89.7	77.8	85.8	87.1
1937	79.0	85.1	82.8	92.7	92.2	76.7	97.9	85.7	93.7	95.2
BALTIMORE AREA										
1926-29	107.2	112.0	107.6	100.6	100.7	106.3	95.5	106.8	96.8	101.2
1933	83.4	95.3	81.9	75.6	77.5	83.9	76.7	78.1	76.0	75.3
1934	83.8	89.1	86.2	89.9	88.5	81.5	86.9	89.1	88.5	91.0
1935	80.0	85.5	82.7	89.9	87.3	78.1	87.6	85.5	88.1	90.6
1936	80.9	85.8	82.4	89.4	88.0	80.0	88.4	86.5	88.3	90.3
1937	88.8	93.2	90.4	93.4	93.8	87.9	97.0	91.8	95.4	93.0
BOSTON AREA										
1926-29	116.3	120.3	115.4	106.2	107.0	118.8	106.3	112.5	108.7	105.8
1933	84.8	91.2	87.7	93.7	89.3	84.7	92.8	88.9	94.9	97.3
1934	94.4	101.1	97.1	101.4	98.3	93.2	99.6	97.8	101.6	104.1
1935	91.2	97.6	94.5	98.2	95.3	90.8	98.5	95.0	100.4	101.1
1936	87.9	94.2	90.8	96.3	93.9	87.3	98.5	92.9	98.6	98.1
1937	103.3	110.5	106.6	111.6	109.2	103.5	112.1	107.6	114.4	113.2
CHICAGO AREA										
1926-29	109.2	114.2	109.8	113.2	109.1	112.9	105.2	105.9	112.9	116.0
1933	98.8	102.3	96.8	98.4	94.0	103.4	94.2	92.2	98.8	102.2
1934	93.4	99.2	94.6	105.0	99.9	95.2	102.8	93.9	103.4	109.9
1935	91.5	97.9	92.4	103.8	98.2	93.0	99.8	92.4	102.4	109.4
1936	97.2	102.9	97.8	110.0	103.9	100.4	105.0	96.6	109.7	115.9
1937	104.8	110.7	105.9	116.9	111.8	108.3	109.1	104.0	115.3	120.8
CINCINNATI AREA										
1926-29	100.5	105.0	101.3	101.0	100.2	100.2	99.6	103.1	100.6	101.0
1933	98.8	102.3	96.8	98.4	94.0	103.4	94.2	92.2	98.8	102.2
1934	93.4	99.2	94.6	105.0	99.9	95.2	102.8	93.9	103.4	109.9
1935	86.4	92.3	89.1	93.5	91.5	83.7	92.9	92.8	94.9	94.5
1935	84.5	89.9	87.7	93.2	90.8	81.9	92.6	91.8	92.6	93.3
1937	98.8	106.1	102.9	107.5	105.3	98.2	107.9	104.7	109.1	109.7
CLEVELAND AREA										
1926-29	107.2	113.4	108.5	111.3	108.3	109.0	103.0	107.2	110.5	114.8
1933	91.8	97.8	93.4	93.7	89.8	92.8	89.4	93.6	94.4	98.3
1934	89.6	97.0	93.4	98.0	95.0	89.0	94.1	95.9	98.7	101.6
1935	87.6	94.5	90.9	96.7	93.5	87.5	94.9	91.7	98.2	100.3
1936	91.7	98.8	94.7	100.0	95.1	92.3	98.1	94.0	101.2	100.3
1937	105.1	112.3	107.7	112.5	109.1	106.5	110.6	108.1	114.8	116.3
DALLAS AREA										
1926-29	112.8	115.8	111.0	102.2	103.4	114.7	104.6	106.7	103.1	102.4
1933	62.4	67.3	65.1	69.2	69.8	60.5	70.7	66.3	72.5	73.3
1934	86.2	91.6	89.3	88.1	89.3	83.7	95.7	91.5	92.4	87.5
1935	82.8	88.9	86.3	85.1	85.1	79.5	84.8	90.8	81.5	84.9
1936	82.5	87.1	84.1	84.5	84.8	81.4	88.0	85.8	86.9	85.1
1937	89.9	95.2	92.2	92.0	94.2	88.5	95.0	94.4	94.1	92.3
DETROIT AREA										
1926-29	103.3	108.4	104.3	102.9	102.4	103.7	103.1	103.5	103.5	104.4
1933	80.2	86.1	83.1	86.6	84.4	78.9	87.7	83.1	86.8	90.2
1934	82.5	86.6	83.5	87.8	87.4	82.2	90.7	83.9	89.2	88.3
1935	78.1	83.4	81.0	88.1	87.1	77.5	92.6	81.8	90.5	90.2
1936	80.6	85.9	84.1	91.9	90.2	80.5	95.9	84.2	95.2	95.3
1937	93.9	100.7	97.3	103.4	101.7	94.3	107.0	97.6	107.4	106.5
MINNEAPOLIS AREA										
1926-29	92.8	98.2	94.6	95.6	96.1	92.8	100.0	93.9	97.9	98.4
1933	74.4	78.1	74.8	76.9	76.7	75.5	83.2	73.2	79.6	80.5
1934	87.0	94.0	90.9	86.8	87.4	84.2	89.5	94.8	89.1	90.5
1935	82.7	88.6	85.7	85.9	86.6	80.2	90.2	88.9	87.7	89.5
1936	88.6	93.6	89.2	92.6	91.6	88.7	96.1	89.2	94.3	95.7
1937	101.6	107.6	104.2	108.6	106.8	103.0	111.7	101.8	111.6	112.1
NEW ORLEANS AREA										
1926-29	93.3	96.3	93.4	86.5	90.6	93.3	93.7	91.5	89.5	86.5
1933	61.2	66.9	66.0	72.8	73.5	57.1	81.6	69.5	76.0	73.7
1934	76.5	81.5	79.3	81.9	83.5	74.0	88.8	79.6	84.2	82.6
1935	76.2	81.3	89.2	81.8	83.4	73.6	88.7	79.7	84.2	82.5
1936	73.4	78.8	76.6	81.8	83.2	70.4	88.9	77.6	83.7	82.6
1937	83.4	87.0	84.7	86.6	89.9	82.6	98.1	84.4	91.6	85.6
PHILADELPHIA AREA										
1926-29	100.3	107.6	103.7	105.9	103.1	98.1	96.3	106.2	102.2	108.8
1933	71.1	75.6	73.0	75.5	74.3	68.5	71.9	75.5	72.8	76.0
1934	84.8	91.0	87.6	91.2	88.7	82.4	81.9	91.6	87.6	92.5
1935	85.4	91.9	88.6	91.3	89.3	82.7	83.4	92.1	88.9	94.7
1936	88.7	95.5	93.0	96.5	92.6	85.7	91.7	97.2	94.7	98.9
1937	91.4	98.0	95.3	98.7	97.8	89.1	100.9	97.7	99.7	100.3

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bl				
			Brick and					Brick a		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	onc.
NEW YORK CITY AREA										
1926-29	133.3	138.4	131.9	122.8	120.4	137.5	113.1	127.4	123.2	125.3
1913	59.5	60.6	57.5	53.9	54.8	61.4	51.4	53.2	53.2	53.7
1914	59.1	60.2	56.9	53.3	53.8	61.3	51.2	53.9	53.1	54.6
1915	57.6	58.7	55.7	52.5	52.8	60.3	49.0	53.1	51.8	53.1
1916	65.9	67.5	65.1	62.3	65.2	67.8	75.6	62.3	69.0	62.1
1917	77.6	78.9	76.4	73.2	78.7	79.9	97.0	72.5	83.9	72.3
1918	87.7	89.9	86.4	82.2	87.2	89.2	98.2	83.6	89.2	83.1
1919	100.5	103.5	99.3	92.0	96.9	101.2	97.1	97.2	93.6	91.6
1920	136.9	142.0	135.8	123.3	130.0	137.1	120.9	135.0	122.6	123.6
1921	109.8	114.5	109.2	101.3	100.8	110.0	96.1	109.1	100.1	103.5
1922	109.5	114.3	109.0	99.0	98.7	109.8	88.4	109.3	96.3	100.1
1923	124.6	131.3	125.6	112.3	112.2	125.5	105.7	127.0	112.7	115.8
1924	123.5	129.1	123.6	114.4	113.9	125.0	108.5	122.4	115.6	115.7
1925	122.8	126.9	120.4	111.4	110.1	125.7	104.2	117.5	110.3	113.3
1926	131.4	136.9	130.1	120.3	116.7	133.7	118.3	128.1	118.2	123.0
1927	128.4	133.3	126.4	117.2	113.1	131.4	106.5	123.6	115.6	119.9
1928	136.5	140.2	133.5	125.8	122.6	140.5	112.4	126.6	128.2	128.0
1929	140.6	143.2	137.6	127.9	129.2	144.4	115.2	131.3	130.8	130.3
1930	126.7	132.6	125.3	124.1	118.7	131.9	113.8	120.3	123.6	128.0
1931	117.8	124.0	117.8	119.7	113.9	122.7	116.7	113.4	122.8	123.8
1932	100.4	108.1	102.6	105.5	99.8	104.8	102.2	99.8	109.1	112.0
1933	85.0	92.4	88.4	101.1	93.3	85.2	90.1	91.0	97.6	106.2
1934	98.3	104.5	100.2	108.2	103.5	99.8	104.6	100.2	108.8	112.2
1935	92.2	92.5	93.2	103.6	99.6	94.1	102.9	92.9	105.3	107.4
1936	96.4	101.8	97.4	106.8	102.2	98.8	104.9	96.2	107.2	110.5
1937	110.5	115.8	111.2	119.6	116.5	113.1	117.8	109.1	120.6	121.2
PITTSBURGH AREA										
1926-29	113.3	118.8	112.8	111.2	107.1	115.4	89.6	112.2	104.6	112.9
1933	86.2	93.0	88.3	94.4	87.7	86.5	76.6	91.3	87.9	99.9
1934	83.7	91.1	87.7	86.9	85.1	80.6	73.4	93.3	82.9	88.4
1935	84.1	90.5	86.1	94.9	83.9	82.2	72.3	89.5	80.9	86.6
1936	92.8	100.4	95.8	97.9	93.8	92.4	82.6	98.4	93.4	101.8
1937	109.8	117.5	112.9	112.1	109.0	109.1	102.1	115.3	110.6	114.1
ST. LOUIS AREA										
1926-29	118.6	121.1	115.7	109.9	108.8	121.3	103.3	111.7	107.7	109.3
1913	62.6	63.7	60.0	56.7	57.3	63.9	53.4	57.8	54.7	57.6
1914	61.1	62.2	59.1	54.4	54.8	62.6	51.4	56.7	53.4	54.7
1915	62.1	63.7	60.3	56.9	56.3	63.6	52.6	57.9	55.1	58.6
1916	58.8	61.3	59.7	62.6	64.9	59.5	79.9	58.1	70.1	62.8
1917	69.7	71.4	69.5	71.7	79.5	71.1	95.3	66.5	81.3	71.5
1918	88.4	89.8	86.3	82.5	87.9	90.6	99.2	81.4	89.1	82.7
1919	95.0	97.5	93.6	91.4	96.4	96.7	99.1	90.1	93.8	91.6
1920	121.0	123.3	118.5	112.1	120.0	123.4	116.1	113.7	113.1	110.7
1921	113.3	116.5	110.5	105.0	104.1	115.3	99.4	107.4	103.2	106.7
1922	98.1	102.4	97.9	96.2	95.7	98.7	89.6	96.8	93.9	97.4
1923	116.5	120.9	115.4	110.2	110.2	119.0	104.9	112.6	109.4	111.7
1924	122.1	126.9	120.7	117.3	114.6	125.0	109.1	117.8	115.7	119.2
1925	118.4	123.6	117.9	116.3	113.2	120.9	107.0	115.6	114.4	118.1
1926	120.7	125.4	119.6	115.5	112.8	123.8	106.5	116.5	114.3	116.9
1927	118.1	122.7	116.7	113.5	110.1	121.2	105.4	113.5	112.5	116.0
1928	117.9	119.2	114.2	106.6	97.5	121.1	102.7	110.6	103.6	106.6
1929	117.7	118.1	112.3	104.0	97.2	119.0	98.6	106.2	100.4	103.8
1930	108.3	113.2	108.4	112.4	107.9	110.6	106.2	106.0	111.3	115.3
1931	103.3	108.4	104.0	108.0	102.9	105.6	102.8	102.1	107.8	110.5
1932	95.0	100.7	96.5	99.0	94.6	97.1	97.0	95.0	101.2	102.4
1933	87.3	94.0	90.1	97.9	93.2	88.4	96.8	90.2	99.6	102.8
1934	97.6	105.5	101.7	105.9	102.3	97.2	102.6	103.7	107.6	109.7
1935	91.6	99.7	96.4	104.2	99.3	90.7	101.8	98.9	105.7	108.6
1936	91.0	99.1	95.5	104.9	100.7	90.5	103.3	98.1	106.2	106.3
1937	98.2	106.5	103.2	113.1	111.1	97.8	114.8	106.0	117.0	117.6
SAN FRANCISCO AREA										
1926-29	87.7	93.7	90.4	97.5	96.5	86.1	95.5	91.8	95.9	99.0
1913	51.7	56.8	55.0	63.8	61.4	49.7	68.8	57.1	64.4	67.8
1914	50.7	55.8	53.6	61.6	58.0	48.7	60.3	55.8	59.4	66.0
1915	51.1	56.3	53.9	62.5	58.5	49.0	60.7	56.2	59.8	67.5
1916	54.1	59.3	58.3	67.6	67.7	52.2	86.2	60.2	73.9	70.1
1917	63.0	67.7	67.8	77.2	81.9	61.7	118.7	68.0	94.6	78.1
1918	76.6	81.0	79.1	85.8	89.1	75.5	109.2	78.7	94.3	87.4
1919	87.8	92.7	90.1	96.7	100.1	87.2	112.1	89.7	102.2	98.5
1920	107.5	112.8	109.8	115.2	121.1	106.9	133.0	109.6	122.1	115.1
1921	89.5	96.8	93.8	102.3	100.2	86.3	106.5	97.2	103.8	105.6
1922	88.3	94.7	91.1	97.1	95.2	86.9	94.9	92.9	95.6	100.5
1923	98.7	104.8	100.8	103.1	103.0	98.8	103.5	100.8	103.1	106.4
1924	86.7	94.2	91.2	99.9	98.0	84.6	99.7	94.3	99.7	103.8
1925	86.5	93.9	91.1	99.5	97.9	84.1	97.0	93.4	98.0	102.1
1926	88.6	96.5	92.2	103.3	100.3	87.3	100.0	95.2	102.6	107.0
1927	87.2	94.8	91.2	102.1	98.3	86.1	97.2	93.1	100.5	103.3
1928	88.1	93.2	90.1	93.1	94.9	86.0	93.5	90.8	90.5	94.4
1929	86.9	90.3	88.1	91.9	92.5	85.0	91.3	88.1	90.0	92.3
1930	86.8	93.8	90.3	100.4	96.8	86.2	100.0	92.0	100.4	104.9
1931	80.6	88.8	85.6	94.6	90.6	79.2	92.5	87.3	94.8	100.7
1932	76.4	84.3	81.6	87.9	84.0	75.4	88.0	84.6	89.8	94.1
1933	68.4	76.7	74.3	84.7	81.0	66.3	82.1	78.5	85.3	89.5
1934	85.0	93.2	90.5	97.5	94.5	82.9	97.2	94.7	99.3	102.4
1935	84.1	91.6	89.0	96.5	94.9	82.1	99.9	92.9	99.8	103.7
1936	86.5	95.6	92.3	103.5	99.8	84.8	102.6	96.2	104.3	109.7
1937	96.7	104.3	101.9	112.2	109.8	95.4	113.0	104.8	113.3	116.0
SEATTLE AREA										
1926-29	84.5	92.2	89.2	101.7	95.1	82.4	100.8	92.2	100.5	105.9
1933	63.4	72.1	69.8	84.6	79.3	58.7	81.5	76.0	81.8	90.0
1934	78.2	86.5	83.8	95.2	92.1	74.9	97.1	87.9	86.2	100.0
1935	81.1	88.6	85.6	92.8	94.6	78.5	99.0	88.1	98.1	101.2
1936	79.8	86.5	83.6	93.7	92.2	77.3	97.4	85.7	95.2	96.5
1937	92.6	103.5	100.4	116.0	110.0	90.0	117.0	106.8	118.1	122.2

MISCELLANEOUS INDEX (**1926 = 100**) Started Jan., 1938.

Plumbing and Heating Equipment — 80.6; **Iron and Steel Products** — 99.7; **Other Building Materials** — 100.2.

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For definition of this index see p. C-6

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Relative Value of Utility Systems

C. F. Lambert, Utility Engineer and Consultant
805 Biscayne Bldg., Miami, Fla.

THIS RECORD brings up to Jan. 1, 1938, values of five utilities originally published in *Engineering News-Record*, May 7, 1925 and brought up to date annually in *Construction Costs*, 1931 to 1937.

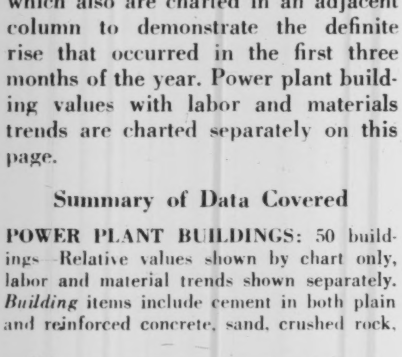
In computing each of these five utility value trends, additional plants have been added until about twice as many are now used as originally. The trend in equipment as well as in prices is thus followed. Values for each year are the average for the entire year.

Definition of the items used in computing these price trends is shown for each utility in the accompanying summary.

Table II shows values on a 1926 base, Table III on a 1913 base. Charts on the opposite page illustrate comparable annual values of all five utilities as well as the annual average trend, the preceding 5- and the preceding 10-year average trends, while Table I gives the 1937 monthly values which also are charted in an adjacent column to demonstrate the definite rise that occurred in the first three months of the year. Power plant building values with labor and materials trends are charted separately on this page.

Summary of Data Covered

POWER PLANT BUILDINGS: 50 buildings—Relative values shown by chart only, labor and material trends shown separately. *Building* items include cement in both plain and reinforced concrete, sand, crushed rock, brick, reinforcing steel, structural steel, roofing, sheet metal, windows, doors, heating material, electric lighting, common labor, carpenters, bricklayers, structural iron workers, metal workers, roofers and electricians.



WATERWORKS: 25 systems 68 items including *Land*, entirely a local matter (study indicates that the most accurate relation of land to other values is obtained by keeping land unit the same throughout the period); *Buildings; Equipment*, boilers, stokers, boiler settings, pumps, motors, steam pumps, condensers, steam piping, miscellaneous equipment, erection; *Distribution*, cast iron pipe, steel pipe, wood pipe, valves, hydrants, meters, standpipes, reservoirs, filter plants, labor; *Miscellaneous*, furniture, fixtures, tools, automobiles, miscellaneous.

ELECTRIC LIGHT PLANTS: 25 plants—84 items including *Land; Buildings; Equipment*, boilers, stokers, steam piping, auxiliary equipment, engines, turbines, diesels, condensers, generators, switchboards; *Distribution*, substation equipment, transformers, lighting equipment, poles, conductors, hardware, wire, insulators, meters, distribution transformers, underground cables, erection; *Miscellaneous*, furniture, fixtures, tools, automobiles, miscellaneous.

Table I—Relative Monthly Value For 1937 with 1913 = 100

	Water Works	Electric Light	Street Ry.	Natural Gas	Artificial Gas
Jan......	184.7	178.6	161.3	178.0	186.4
Feb......	185.1	181.8	163.8	178.2	186.5
March....	193.0	186.5	168.4	187.6	196.4
April.....	197.1	188.1	170.3	190.1	198.2
May......	197.7	192.2	171.2	190.1	199.3
June......	197.9	192.2	171.4	190.2	199.3
July......	198.0	192.2	171.9	190.2	199.4
August....	198.4	192.6	172.3	190.7	199.7
Sept......	198.4	192.4	172.3	190.8	199.7
Oct......	198.1	191.3	171.2	190.7	199.5
Nov......	198.5	190.2	170.8	191.1	200.1
Dec......	198.2	189.4	170.4	191.1	200.0
Average...	195.5	188.4	168.8	188.3	197.1

STREET RAILWAY SYSTEMS: 10 systems—82 items including *Land; Buildings*, car barns and shops; *Track Construction*, tangent track, special layouts, grading, paving, concrete and steel bridges, rails, spikes, bolts, ties, labor; *Span Construction*, poles, conductors, pole hardware, copper, erection; *Cars & Equipment; Miscellaneous*, furniture, fixtures, tools, automobiles, miscellaneous. Power plant buildings excluded because power is so frequently purchased from separate department or company.

NATURAL GAS PLANTS: 15 systems—58 items including *Land; Buildings; Equipment*, holders, small pumps, miscellaneous; *Distribution*, cast iron pipe, steel pipe, regulators, governors, valves, meters; *Miscellaneous*, furniture, fixtures, tools, autos.

MANUFACTURED GAS SYSTEMS: 25 plants—63 items including *Land; Buildings; Equipment*, boilers, gas machinery holders, miscellaneous; *Distribution*, cast iron pipe, steel pipe, regulators, valves, meters; *Miscellaneous*, furniture, fixtures, tools, autos.

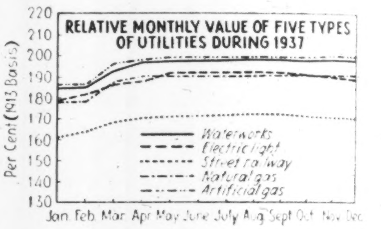
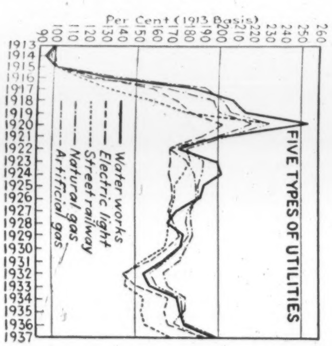
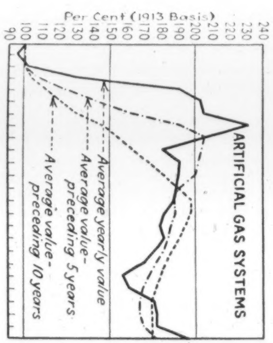


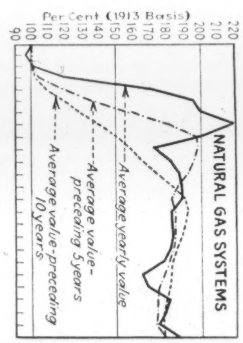
Table II—Relative Yearly Utility Values Based on 1926 Costs—Lambert

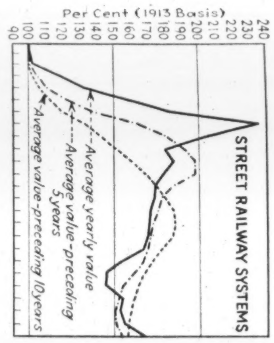
	1913	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937
Water Works Plants															
A..	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
B..	5.9	11.0	10.9	11.0	10.7	10.6	10.8	10.5	9.6	8.8	9.0	9.9	9.9	10.1	11.3
C..	6.4	12.2	12.1	12.0	11.9	12.2	12.3	11.8	11.1	10.3	11.1	12.1	12.0	12.1	13.6
D..	38.6	80.6	75.8	74.4	67.5	65.6	69.8	68.9	65.2	59.7	62.3	68.7	69.4	69.9	76.9
E..	.6	1.1	1.1	1.1	1.0	1.0	1.0	1.0	.8	.7	.9	.9	.9	.9	1.0
T..	53.0	106.4	101.4	100.0	92.6	90.9	95.4	93.7	88.2	81.0	84.8	93.1	93.7	94.5	104.3
Electric Light Plants															
A..	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
B..	5.9	10.8	10.8	10.8	10.6	10.6	10.8	10.3	9.6	8.7	8.8	9.8	9.8	10.0	11.1
C..	22.7	42.8	42.9	42.5	41.9	42.5	43.9	41.4	38.8	35.5	38.5	43.4	43.1	43.3	48.0
D..	26.1	40.5	41.3	41.6	41.4	42.5	44.2	42.0	39.2	34.5	36.0	41.1	40.6	41.3	46.5
E..	2.0	3.6	3.6	3.5	3.3	3.3	3.3	3.2	2.9	2.6	2.7	2.9	2.9	2.9	3.2
T..	58.3	99.3	100.2	100.0	98.8	100.5	103.8	98.5	92.1	82.9	87.6	98.8	98.0	99.1	110.4
Street Railway Systems															
A..	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
B..	2.7	5.0	5.0	5.0	4.9	4.9	4.9	4.8	4.4	3.9	4.1	4.5	4.5	4.6	5.1
F..	37.1	65.1	63.6	63.6	62.7	62.6	61.7	60.4	57.9	53.5	54.2	56.5	55.5	56.0	60.9
G..	12.1	24.8	23.5	23.5	23.5	23.0	23.0	23.1	19.6	18.6	17.8	20.7	21.0	21.6	24.0
H..	3.3	5.1	4.7	4.6	4.7	4.8	5.0	4.8	4.5	4.0	4.0	4.3	4.3	4.5	4.7
E..	1.0	1.8	1.8	1.8	1.8	1.7	1.7	1.7	1.5	1.4	1.4	1.6	1.6	1.6	1.8
T..	57.7	103.3	100.1	100.0	99.1	98.5	97.8	96.3	89.4	82.9	83.0	89.1	88.4	89.8	98.0
Natural Gas Plants															
A..	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
B..	.9	1.5	1.6	1.6	1.5	1.5	1.5	1.5	1.4	1.3	1.3	1.4	1.4	1.4	1.6
C..	.9	1.7	1.6	1.6	1.6	1.6	1.5	1.5	1.4	1.3	1.4	1.5	1.6	1.7	1.8
D..	49.1	92.3	93.3	93.0	90.6	90.8	91.2	89.9	87.5	82.7	83.2	90.0	89.4	86.1	92.8
E..	1.5	3.0	2.9	2.9	2.8	2.8	2.8	2.8	2.6	2.3	2.3	2.4	2.4	2.4	2.6
T..	53.3	99.4	100.3	100.0	97.4	97.6	97.9	96.6	93.8	88.5	89.1	96.2	95.7	92.5	99.7
Artificial Gas Systems															
A..	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
B..	3.6	6.7	6.6	6.7	6.5	6.4	6.6	6.4	5.9	5.4	5.5	6.1	6.1	6.2	6.9
C..	16.2	32.6	32.2	32.3	32.1	31.6	31.2	28.7	26.2	25.2	27.4	30.6	31.3	31.8	37.1
D..	30.1	57.8	57.1	56.8	54.0	53.8	55.3	54.6	53.2	49.3	49.5	54.3	54.3	53.4	57.3
E..	1.1	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.8	1.6	1.6	1.7	1.7	1.7	1.8
T..	53.2	101.4	100.2	100.0	96.8	96.0	97.3	93.8	89.3	83.7	86.1	94.9	95.6	95.3	105.3

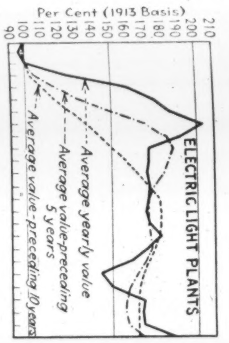
A—Land. B—Buildings. C—Equipment. D—Distribution. E—Miscellaneous. F—Track Construction. G—Cars and Equipment. H—Span Construction. T—Total.











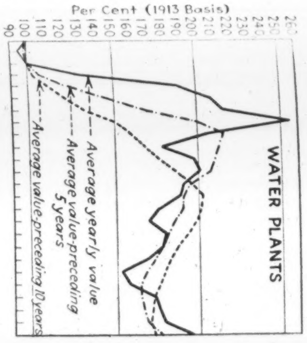


Table III—Relative Yearly Value of Main Items Entering Into Physical Value of Five Utilities 1913-1937—1913=100—Lambert

	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937
Waterworks Plants																									
Land....	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
Bldgs....	11.2	10.8	11.1	13.3	16.5	18.5	20.6	25.6	20.9	19.0	20.8	20.7	20.6	20.7	20.2	20.1	20.4	19.7	18.2	16.6	16.9	18.7	18.6	18.9	20.9
Equip....	12.1	12.0	14.0	17.3	22.6	23.4	24.3	26.0	23.4	21.8	22.9	23.0	22.9	22.7	22.5	23.0	23.2	22.3	20.9	19.5	21.0	22.9	22.5	22.7	25.0
Distr.....	72.7	67.1	71.3	94.1	143.2	161.1	165.8	197.8	155.8	130.1	149.8	152.2	143.2	140.5	127.5	123.8	131.8	130.0	123.3	112.6	116.8	129.7	130.7	131.8	144.8
Misc.....	1.1	1.1	1.2	1.4	1.8	2.0	2.3	2.8	2.2	2.0	2.2	2.0	2.1	2.0	1.9	1.9	1.9	1.9	1.6	1.4	1.6	1.7	1.7	1.7	1.9
Total..	100.0	93.9	100.5	129.0	187.0	207.9	215.9	255.1	205.2	175.8	198.6	200.8	191.7	188.8	175.0	171.7	180.2	176.8	166.9	153.0	159.2	175.9	176.4	178.0	195.5
Electric Light Plants																									
Land....	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Bldgs....	10.1	9.7	10.0	12.0	14.9	16.7	18.5	23.1	19.9	17.1	18.8	18.6	18.5	18.6	18.2	18.2	18.5	17.8	16.5	14.9	15.2	16.8	16.7	17.0	18.8
Equip....	38.9	36.7	36.7	47.9	73.5	79.5	81.0	86.7	84.6	75.1	73.4	73.5	73.6	73.0	72.0	72.9	75.4	71.0	66.6	60.9	66.2	75.5	73.9	74.3	82.2
Distr.....	44.8	43.5	47.1	56.1	63.4	69.6	75.2	82.6	77.4	70.4	70.4	69.6	70.9	71.2	71.1	72.9	75.8	71.7	67.1	59.4	61.8	70.3	69.2	70.3	79.3
Misc.....	3.4	3.4	3.4	4.1	5.1	6.0	6.8	8.6	6.8	6.2	6.2	6.1	6.1	6.0	5.7	5.6	5.6	5.5	5.0	4.5	4.6	4.9	4.9	4.9	5.3
Total..	100.0	96.1	100.0	122.9	159.7	174.6	184.3	203.8	191.5	171.6	171.6	170.6	171.9	171.6	169.8	172.4	178.1	168.8	158.0	142.5	150.6	169.3	167.5	169.3	188.4
Street Railway Systems																									
Land....	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Bldgs....	4.7	4.5	4.6	5.6	6.9	7.8	8.6	10.8	8.8	8.0	8.8	8.7	8.6	8.6	8.5	8.5	8.6	8.3	7.6	6.9	7.1	7.8	7.8	7.9	8.8
Trk. Cstr.	64.3	63.1	63.4	71.9	83.3	104.8	113.8	144.1	119.9	105.4	113.6	112.8	110.2	110.2	108.6	108.5	106.9	104.7	100.1	92.9	94.1	97.9	96.0	96.9	104.6
Span. Cstr	5.8	5.4	6.3	8.7	9.9	9.7	10.0	11.1	9.0	8.5	8.7	8.8	8.1	8.0	8.1	8.4	8.7	8.4	7.8	7.0	7.0	7.5	7.4	7.7	8.2
Cars. eq..	20.9	22.4	22.8	25.1	27.2	31.1	44.4	61.1	59.1	53.0	47.0	42.9	40.7	40.7	40.7	39.9	39.9	39.9	34.0	32.4	30.8	35.8	36.4	37.3	41.6
Misc.....	1.7	1.6	1.6	2.2	2.9	3.2	3.5	4.3	3.6	3.2	3.3	3.2	3.2	3.2	3.1	3.0	3.0	3.0	2.7	2.5	2.5	2.7	2.7	2.7	3.0
Total..	100.0	99.6	101.3	116.1	132.8	159.2	182.9	234.0	203.0	180.7	184.0	179.0	173.4	173.3	171.6	170.9	169.7	166.9	154.8	144.3	144.1	154.3	152.9	155.1	168.8
Natural Gas Plants																									
Land....	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Bldgs....	1.6	1.5	1.6	1.9	2.4	2.6	2.9	3.7	3.0	2.7	2.9	2.9	3.0	3.0	2.9	2.9	2.9	2.8	2.6	2.4	2.4	2.7	2.7	2.7	3.0
Equip....	1.7	1.6	1.8	2.6	4.0	3.6	3.5	4.1	3.1	3.1	3.1	3.1	3.0	3.0	3.0	3.0	2.9	2.8	2.6	2.4	2.7	2.9	2.9	3.0	3.3
Distr.....	92.2	89.9	92.0	111.0	155.7	182.9	186.5	202.4	187.3	158.4	168.7	173.2	175.0	174.6	169.9	170.3	171.1	168.8	164.7	155.0	157.8	169.0	168.2	163.0	175.5
Misc.....	2.9	2.8	2.9	3.3	4.4	5.1	5.8	7.8	6.4	5.6	5.9	5.7	5.5	5.4	5.3	5.2	5.2	5.2	4.8	4.3	4.2	4.5	4.4	4.4	4.9
Total..	100.0	97.4	99.9	120.4	168.1	195.8	200.3	219.6	201.4	171.4	182.2	186.5	188.1	187.6	182.7	183.0	183.7	181.2	176.3	165.7	168.7	180.7	179.8	174.7	188.3
Artificial Gas Systems																									
Land....	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
Bldgs....	6.8	6.5	6.7	8.1	10.0	11.2	12.5	15.5	12.7	11.5	12.6	12.5	12.4	12.5	12.2	12.1	12.4	12.0	11.1	10.1	10.3	11.3	11.3	11.5	12.7
Equip....	30.4	29.1	33.1	49.9	76.4	68.7	67.2	75.9	66.1	62.8	63.4	61.2	60.5	60.6	60.3	59.4	58.7	53.9	49.2	47.2	51.4	57.4	58.3	59.2	68.7
Distr.....	56.5	54.4	55.6	68.1	98.3	114.8	116.5	130.4	115.6	98.2	107.5	108.6	107.3	106.7	101.5	101.0	103.8	102.6	99.7	92.5	93.8	102.1	102.0	100.3	108.0
Misc.....	2.1	2.1	2.1	2.5	3.1	3.6	4.1	5.5	4.6	4.1	4.2	4.0	3.9	3.8	3.8	3.7	3.7	3.7	3.5	3.0	3.1	3.2	3.2	3.2	3.5
Total..	100.0	96.3	101.7	132.8	192.0	202.5	204.5	231.5	203.2	180.8	191.9	190.5	188.3	187.8	182.0	180.4	182.8	176.4	167.7	157.0	162.8	178.2	179.0	178.4	197.1

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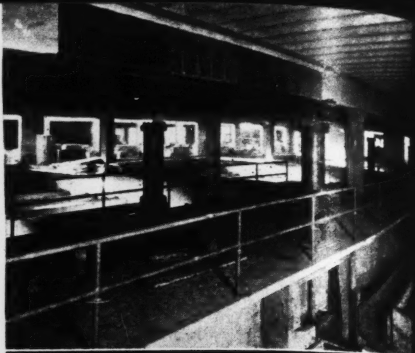
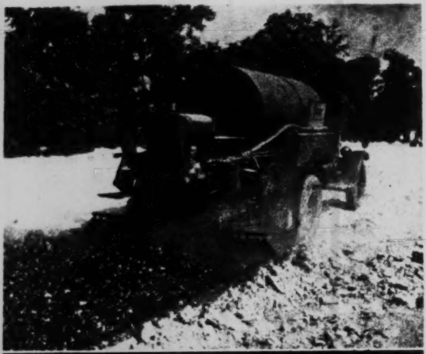
DATA ON THESE
SUBJECTS

LARGE PIPE
Steel Plate Welded Pipe. Also platework

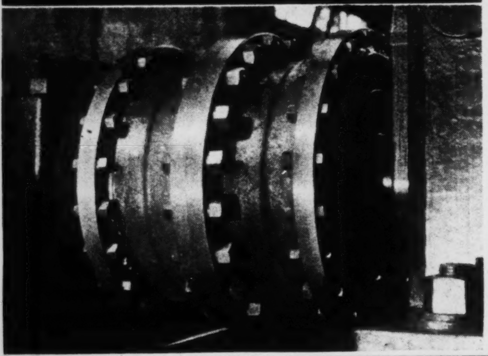


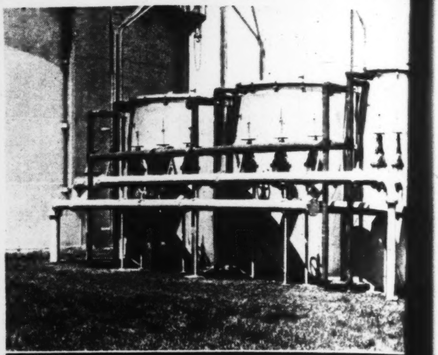
WATER WORKS EQUIPMENT
Valves, Sluice Gates, Fire Hydrants, etc



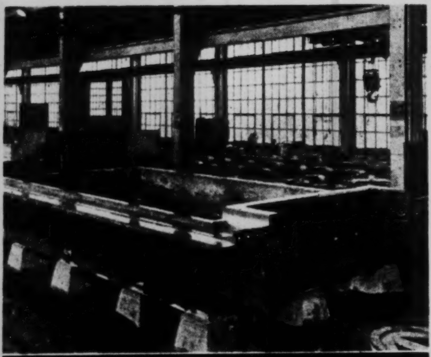
PAVING
With Koppers Tarmac Road Tar

SELF-ALIGNING COUPLINGS
Famous Fast's Couplings



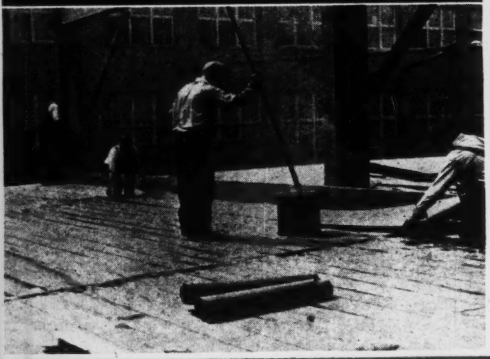


SEWAGE DISPOSAL EQUIPMEN
That permits use of sewage gas for he
and power

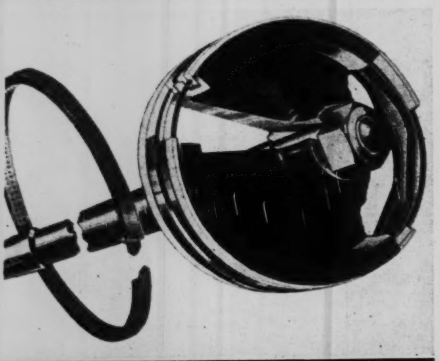


CASTINGS
Bronze and Iron Castings

ROOFING
For Large and Small Buildings

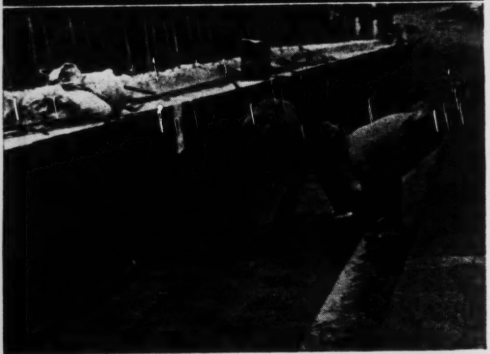


PRESSURE-TREATED TIMBE
For Bridges and other structural us
Poles, Posts



PISTON RINGS
Piston Rings and Cylinder Packing

WATERPROOFING
With Coal Tar Pitch, Felt and Fabric



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ISSUE

KOPPERS *products*

Contract Unit Bid Prices

Selected list of 104 projects showing how contractors bid in 1937-1938

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DAM TRESTLES, MISS. RIVER

OWNER: U. S. Engineer Dept., Rock Island, Illinois.

PROJECT: Construction of 35 Poiree dam trestles with stringers and stringer buffers, to form steel A-frames to support timber needles for temporary dam for lock and dam gates for Mississippi River locks, and delivering them f.o.b. U. S. Siding, Keokuk, Iowa.

BIDS: Fourteen bids were received October, 1937, ranging from the contract low of $15,615 to $25,057.

LOW BIDDERS:

1. Worden-Allen Co., Milwaukee, Wis. (contract)	$15,615
2. Mississippi Valley Struct. Steel Co., Melrose Park, Ill	15,768
3. The R. C. Mahon Co., Chicago, Ill	17,263

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Structural steel	244,684 lb.	$0.044	$0.0443	$0.0458
2. Steel forgings	36,468 lb.	.11	.1174	.1355
3. White oak timber	3.159 M.b.m.	265.00	205.00	353.00

PENSACOLA DAM, OKLA.

OWNER: Grand River Dam Authority, Vinta, Okla.; Holway & Neuffer, Consulting Engineers, Tulsa.

PROJECT: Construction of preliminary work for Pensacola Dam, part of Grand River Project, Vinta, Okla., including excavation for east spillway and 7,500 ft. core drilling.

BIDS: Twenty bids were opened in January, 1938, for the excavation provided for in Contract 1, ranging from the contract low of $43,500 to $129,500; seven bids submitted for the core drilling under Contract 2 ranged from $34,675 to $58,900. A lower bid of $24,700 was submitted by Leo Sanders, Oklahoma City, contingent upon the securing of Contract 1 for $61,000.

LOW BIDDERS:

Contract 1—Excavation.

1. M. E. Gillioz, Inc., Monett, Mo. (contract)	$43,500
2. List & Clark Const. Co., Kansas City, Mo.	53,800
3. R. G. Aldridge, Kansas City, Kan.	54,100

Contract 2—Core drilling.

1. Sprague & Henwood, Inc., Scranton, Pa. (contract)	34,675
2. M. E. Gillioz, Inc., Monett, Mo.	39,590
3. E. J. Longyear Co., Minneapolis, Minn.	39,900

CONTRACT 1 — EXCAVATION FOR EAST SPILLWAY

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clearing	l. s.	$2,500.00	$800.00	$800.00
2. Earth excav	300,000 c. y.	1.35	1.75	1.74
3. Rock excav	1,000 c. y.	.50	.50	1.10

CONTRACT 2 — CORE DRILLING

		(1)	(2)	(3)
1. Drill overburden, 2¼ in. core	2,000 l. f.	$2.75	$1.60	$2.65
2. Drill overburden, 6 in. core	500 l. f.	2.95	2.65	4.30
3. Drill rock cores, 2¼ in., vert	3,000 l. f.	3.80	5.25	3.70
4. Drill rock cores, 2¼ in., obl	1,000 l. f.	4.05	5.50	3.70
5. Drill rock cores, 6 in. vert	1,000 l. f.	6.50	8.50	10.40
6. Casing left in holes, items 3 – 4	2,000 l. f.	.90	.40	.85
7. Casing left in holes, item 5.	500 l. f.	1.50	2.15	1.50
8. Labor, equip. for pressure tests	800 hr.	4.00	4.30	6.00

UNIT BID PRICES—DAMS

EARTH FILL RESERVOIR, CALIF.

OWNER: City of Ventura, Calif.; C. Froerer, Engineer.

PROJECT: Construction of earth embankment type reservoir for water power purposes in the City of Ventura, Calif.

BIDS: Twenty-three bids were opened in August, 1937, ranging from $70,498 to $104,329. Alternative proposals were also submitted on different types and sizes of sump, gate valves, and concrete pipe, upon which basis the contract was awarded at $71,037, with the contractor furnishing all materials and minimum city wages prevailing.

LOW BIDDERS:

1. Minnis & Moody, Los Angeles, Calif.	$70,498
Alternative	71,540
2. J. P. Immel, Ventura, Calif.	70,514
Alternative (contract)	71,037
3. C. F. Robbins, Los Angeles, Calif.	73,937
Alternative	74,424

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Reservoir excav	80,700 c. y.	$0.19	$0.18	$0.187
2. Rolled embank	19,000 c. y.	.30	.125	.097
3. Subgrading	19,500 c. y.	.07	.05	.13
4. Rein. conc. surface	19,400 s. y.	1.17	1.15	1.10
5. Slab reinforcing	281,000 lb.	.05	.06	.06
6. Structural concrete	206 c. y.	20.00	22.00	18.00
7. Misc. steel	18,000 lb.	.06	.06	.06
8. Reinf. conc. pipe, 36 in	488 l. f.	6.20	7.00	7.30
9. Reinstall Martin gate valve	L. S.	25.00	30.00	260.00
10. Redwood lumber	6M.b.m.	125.00	90.00	126.00
11. Weep holes	234 ea.	.75	.50	1.04
12. Gate valve, 24 in	L. S.	250.00	250.00	903.00
13. Reinf. conc. pipe, 24 in	24 ft.	4.00	4.00	13.00
14. Reinf. conc. pipe, 20 in	197 ft.	3.50	5.40	5.50
15. Screens	2 ea.	25.00	20.00	23.00
16. Reservoir sump	1 ea.	15.00	50.00	19.00
17. C. I. drain pipe, 8 in	96 ft.	2.00	4.25	4.50
18. Gate valve, 8 in	1 ea.	30.00	35.00	50.00
19. Concrete pipe, 8 in	397 ft.	.35	2.75	7.50
20. Reinstall fence	415 l. f.	.24	.25	.29
21. New fence	1,025 l. f.	.60	.60	.68
16A. Reservoir sump	1 ea.	50.00	60.00	100.00
18A. Gate valve, 16 in	1 ea.	150.00	75.00	414.00
19A. Reinf. conc. pipe, 16 in	493 l. f.	2.55	4.00	7.00

TIONESTA DAM, PA.

OWNER: U. S. Engineer Dept., Pittsburgh, Col. W. E. R. Covell, district engineer.

PROJECT: Tionesta earthfill dam on Tionesta Creek, Allegheny River watershed, Pennsylvania, Ohio River flood control project. Dam is rolled fill embankment 1,050 ft. long, 154 ft. high. Concrete cutoff wall 10 ft. into rock full length of fill. Overburden from 20 to 45 ft. deep. Outlet tunnel 19 ft. dia., 1,875 ft. long, with approach and outlet channels. Saddle spillway is concrete lined.

CONDITIONS: Stream diversion through outlet tunnel. Contract time limit 1,096 days, penalty $300 daily. Government furnishes conduit lining, valves, pumps, gates and operating machinery; contractor installs this equipment and furnishes all other materials (note cement is separate contract item). Government pays for damage to permanent structures caused by flood overtopping cofferdam built to designated height. Fill to be placed in layers 6 in. uncompacted thickness and rolled to desired compaction. Minimum wage rates, 65c. to $1.30. Government assumes cost of new state or federal taxes imposed on contractor after bids are opened.

BIDS: Eleven bids opened Dec. 18, 1937, ranging from $2,624,610 to $3,403,165. Engineer's estimate was $3,487,511.

LOW BIDDERS:

*1. S. J. Groves & Sons Co., and Lundin Bros., Minneapolis	$2,624,610
2. Minder Const. Corp., Chicago	2,637,509
3. Dravo Contr. Corp., Pittsburgh	2,747,530

Item	Quan	Unit Prices (1)	(2)	(3)
1. Cofferdam	L.S.	$13,000.00	$51,625.00	$83,000.00
2. Remove exist. structures	L.S.	2,000.00	1,345.00	10,000.00
3. Clear, grub dam site	L.S.	10,000.00	2,375.00	10,000.00
4. Stripping	7,500 c.y.	1.00	.32	.50
5. Common excav	1,150,000 c.y.	.22	.29	.30
6. Excav., pits A and B	660,000 c.y.	.20	.29	.30
7. Excav., pit C	40,000 c.y.	.30	.34	.30
8. Rock excav., pits B and D.	120,000 c.y.	.75	.88	.80
9. Rock excav	320,000 c.y.	.75	.69	.97
10. Special rock excav	13,000 c.y.	2.50	1.15	3.00
11. Rock excav., trench	3,600 c.y.	6.00	6.40	6.00
12. Tunnel excav	34,000 c.y	12.00	7.00	8.00
13. Steel timbering, tunnel	670,000 lb.	.10	.08	.08
14. Channeling or line drill	11,000 s.f.	.80	.50	1.00
15. Rock treatment	1,800 sqs.	2.00	4.00	2.50
16. Uncompacted backfill	3,200 c.y.	.30	.10	.40
17. Compacted backfill	19,000 c.y.	.50	.60	.80
18. Rolled fill embank	1,200,000 c.y.	.06	.05	.08
19. Pervious fill embank	470,000 c.y.	.04	.05	.04
20 Rock embank	220,000 c.y.	.15	.13	.07
21. Select rock embank	90,000 c.y.	.30	.15	.12
22. Rolling, each add. 3 trips.	200,000 sqs.	.02	.02	.02
23. Top soil in borrow pits	40,000 c.y.	.50	.40	.20
24. Seeding borrow pits	50 acre	100.00	120.00	110.00
25. Gravel filters, drains	13,000 c.y.	1.25	1.00	.90
26. Rock paving	5,400 c.y.	5.00	5.00	3.50
27. Rock paving, gutters	100 c.y.	15.00	10.00	8.00
28. Road surfacing	12,000 s.y	1.50	1.80	1.65
29. Diamond core drilling	40,000 l.f.	1.50	1.70	1.40
30. Drill holes, rock or conc.	5,400 l.f.	.80	.50	1.00
31. Furnish cement	90,000 bbl	2.25	2.25	2.20
32. Reinf. steel	2,600,000 lb.	.05	.045	.055
33. Pressure grouting	53,000 sax	.75	.75	.70
34. Concrete, intake, Cl. A.	550 c.y.	30.00	22.00	24.00
35. Concrete, intake, Cl. B.	22,000 c.y	9.00	12.65	10.00
36. Concrete, spillway	11,000 c.y.	8.00	9.50	9.00
37. Concrete, tunnel	16,000 c.y.	10.00	10.00	8.00
38. Concrete, grout cap	700 c.y.	8.00	7.70	10.00
39. Grouting recesses	550 c.y.	20.00	16.00	20.00
40. Install equip. furn. by govt	720,000 lb.	.02	.02	.02
41. Steel in bridge	205,000 lb.	.09	.09	.10
42. Wrought iron pipe	14,000 lb.	.20	.17	.20
43. Misc. metal work	110,000 lb.	.20	.18	.18
44. Black steel pipe	27,000 lb.	.20	.20	.20
45. Cast iron pipe	200,000 lb.	.07	.06	.07
46. Misc. brass and bronze	200 lb.	1.00	1.50	1.00
47. Copper water stops	14,000 lb.	.50	.60	.50
48. Electric conduits	L.S.	3,500.00	3,750.00	2,500.00
49. Power and light system	L.S.	6,500.00	6,200.00	5,000.00
50. Oper. house superstr	L.S.	45,000.00	43,000.00	36,000.00
51. Slope drain	840 l.f.	2.00	1.55	2.00
52. Highway guard rail	10,000 l.f.	1.00	.82	.90
53. Gunite	3,200 c.f.	1.25	1.26	.60

* Awarded contract.

VALLECITO DAM, COLO.

OWNER: U. S. Bureau of Reclamation, Durango, Colo.; C. A. Burns, construction engineer.

PROJECT: Construction of Vallecito Dam across Pine River, 10 miles north of Bayfield, Colo., including a reinforced-concrete outlet conduit in open cut, and a concrete-lined open channel spillway, both at right embankment. Dam will have crest length of 4,000 ft. and a maximum height of 125 ft. above streambed. It will consist of a moistened and rolled clay embankment, with 3-ft. riprap blanket on upstream face, and a cobble and rockfill from toe to crest, of increasing thickness, on downstream slope. Outlet conduit, 611 ft. long, will be provided with trash rack, and water flow will be regulated by four 5x5-ft. hydraulically operated slide gates located 38 ft. upstream from dam axis.

CONDITIONS: Completion is scheduled for 1,380 days after contract award. Government will furnish f.o.b. Ignacio, Colo., all cement, admixtures, reinforcing steel, permanent metal installations, grout units, operating mechanisms, structural steel and miscellaneous iron, permanent equipment for dam operation, and in general all materials other than sand, gravel, and forms required for the completed construction. Unimproved road to site; nearest railroad at Durango, 15 miles away.

The outlet conduit is a double-barrel box, each chamber 8x8 ft. with semi-circular roof. Early diversion of the river will be through a channel excavated through the center of the site, to the right of the present river channel, requiring a log crib drop at the discharge end. The second stage of diversion will be through the outlet conduit. Cofferdam is required at the upstream side of the dam only, as the river falls sharply through the site. Earth borrowpits for the

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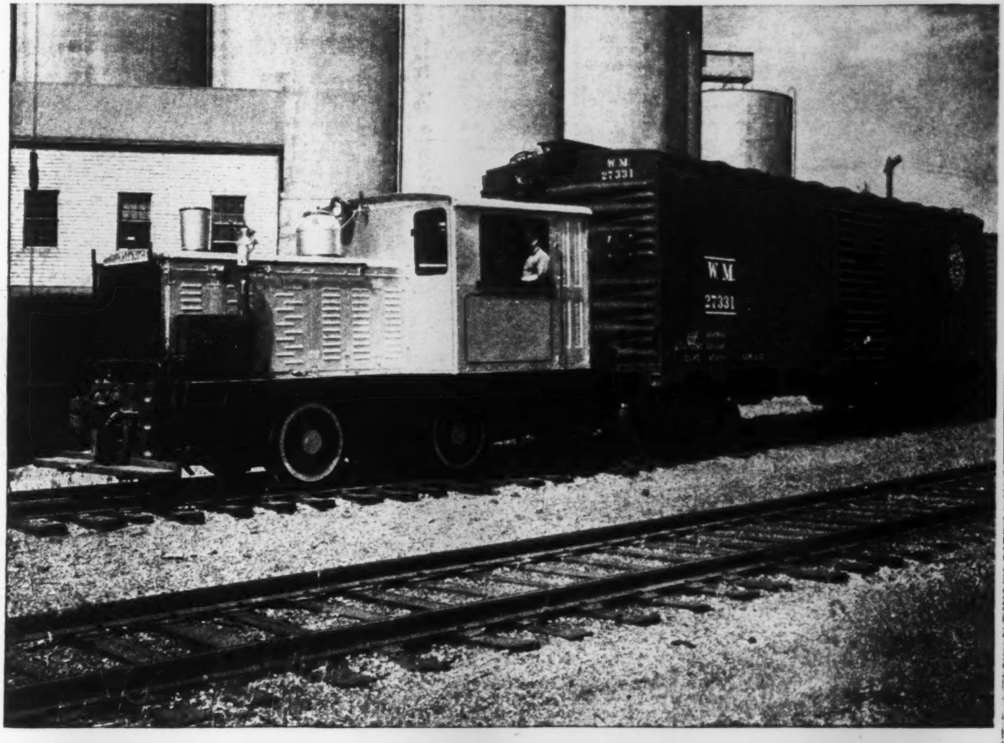

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LOCOMOTIVES

embankment are located on both sides of the valley, centering about 1,500 ft. upstream from the axis of the dam.

BIDS: Nine bids were opened Dec. 15, 1937, ranging from $2,108,445 to $3,424,495. Bidding was exceptionally close for a project of this size. The spread between low and second bids was only $71,090, or 3.4 per cent; between low and third, $85,270, or 4 per cent. The first five bids were within a range of $274,360, or 13 per cent over the low figure.

LOW BIDDERS:

1. Martin Wunderlich Co., Jefferson City, Mo. (contract)	$2,108,445
2. Shofner, Gordon & Hinman, Los Angeles	2,179,535
3. S. J. Groves & Son Co. and Lundin Bros., Minneapolis	2,193,715

Item	Quan.	Unit Prices		
		(1)	(2)	(3)
1. Diversion, care of river	L. S.	$15,000.00	$10,000.00	$5,000.00
2. Strip borrow pits	125,000 c. y.	.23	.25	.21
3. Strip embankment	200,000 c. y.	.20	.40	.50
4. Separate excav., channel	70,000 c. y.	.35	.60	.33
5. Excav. rock, div. channel	500 c. y.	2.00	1.50	4.00
6. Excav., common, spillway upstream	151,000 c. y.	.23	.35	.25
7. Excav., common, spillway downstream	444,000 c. y.	.35	.40	.36
8. Excav. rock, spillway	75,000 c. y.	.60	.70	1.00
9. Excav., common, outlet	140,000 c. y.	.35	.30	.33
10. Excav. rock, outlet	3,600 c. y.	2.00	2.20	3.00
11. Excav., common, cutoff trench	185,000 c. y.	.35	.66	.50
12. Excav., rock, cutoff trench	500 c. y.	2.00	2.50	10.00
13. Excav., rock, cutoff wall	1,000 c. y.	5.00	10.00	10.00
14. Excav., common, for embank	3,100,000 c. y.	.23	.19	.21
15. Excav., rock for embank	95,000 c. y.	2.00	1.20	1.75
16. Excav., misc.	50,000 c. y.	.35	.60	.33
17. Backfill, structures	45,000 c. y.	.50	.25	.30
18. Refill diversion channel	35,000 c. y	.10	.10	.21
19. Earth fill, embank	3,200,000 c. y.	.05	.09	.06
20. Sluiced gravel fill, embank	80,000 c. y.	.25	.20	.15
21. Rock fill, embankment slopes	275,000 c. y.	.15	.15	.10
22. Riprap, inlet channel, spillway	123,000 c. y.	.20	.25	.25
23. Riprap, dumped, spillway	3,700 c. y.	.20	.30	.50
24. Drains, 12 in	2,200 l. f.	1.00	.90	1.25
25. Drains, 8 in	3,800 l. f.	.90	.80	1.00
26. Drains, 6 in	5,100 l. f.	.80	.80	.75
27. Drains, 4 in	3,300 l. f.	.70	.70	.60
28. Porous concrete	70 c. y.	20.00	10.00	11.00
29. Drill weep holes	120 l. f.	2.00	1.20	1.00
30. Drill grout holes, to 25 ft	2,200 l. f.	1.00	.70	1.50
31. Drill grout holes, 25-50 ft	5,500 l. f.	1.50	1.40	2.75
32. Install grout pipe and fittings	3,800 lb.	.30	.12	.10
33. Pressure grouting	7,700 c. f.	1.00	1.30	1.00
34. Drill anchor holes	3,700 l. f.	1.00	.60	.50
35. Concrete, cutoff walls	1,500 c. y.	13.00	17.00	14.00
36. Concrete, outlet works, etc	1,200 c. y.	20.00	20.00	16.50
37. Concrete, outlet conduit	2,500 c. y.	14.00	14.00	14.00
38. Concrete, floor, spillway, outlet channels.	7,700 c. y.	10.00	10.00	11.50
39. Concrete, spillway, outlet channels	9,600 c. y.	15.00	12.00	15.50
40. Concrete, control house	60 c. y.	40.00	22.00	38.50
41. Concrete, parapet, curb walls	1,700 c. y.	15.00	17.00	14.50
42. Place reinforcing bars	2,770,000 lb.	.017	.02	.02
43. Install metal sealing strips	1,000 l. f.	.50	.20	.55
44. Install expansion joint filler	2,000 s. f.	.50	.10	.25
45. Concrete surfacing, special	2,300 s. y.	1.00	1.00	1.65
46. Control house, excl. concrete	L. S.	1,000.00	1,000.00	1,000.00
47. Log crib drop, diversion channel	L. S.	16,000.00	4,900.00	10,000.00
48. Install trash rack	55,000 lb.	.02	.02	.04
49. Install hydraulic slide gates, etc	173,000 lb.	.03	.025	.04
50. Install controls, slide gates	10,000 lb.	.05	.12	.10
51. Install radial gates	250,000 lb.	.03	.025	.04
52. Place bit. material in float drums	60,000 lb.	.015	.01	.05
53. Install radial gate hoists	10,500 lb.	.10	.10	.10
54. Install metal stairway	14,000 lb.	.10	.10	.10
55. Install pipe handrail	7,000 lb.	.08	.10	.10
56. Install misc. metal work	12,000 lb.	.05	.10	.10
57. Install elec. metal conduit	600 l. f.	.20	.30	.50
58. Install elec. conductors.	200 lb.	.50	.50	.50
59. Install electrical apparatus	2,500 lb.	.20	.50	.30

LACKAWACK DAM CAISSONS

OWNER: New York Board of Water Supply; Walter E. Spear, Chief Engineer.

PROJECT: Excavation of cut off trench and sinking of two exploratory caissons for the Lackawack dam in town of Wawarsing, Ulster Co. New York, forming part of the Delaware River aqueduct.

BIDS: Seven bids were opened June 2, 1937, ranging from a low of $737,777 to a high of $1,248,945.

LOW BIDDERS:

1. Triest Const. Co. New York, N. Y.	$737,777
2. The Two Companies Inc. Framingham, Mass.	779,805
3. Frederick Snare Corp., New York, N. Y.	783,260

Item	Quan.	Unit Prices		
		(1)	(2)	(3)
1. Remove buildings	L. S.	$12,733.00	$12,000.00	$10,000.00
2. Test borings	7,500 l. f.	5.00	4.30	4.00
3. Well drillings	1,000 l. f.	18.00	11.50	20.00
4. Excav. earth, open cut	55,000 c. y.	1.00	1.00	1.50
5. Exc. caissons, to El. 600	3,000 c. y.	28.00	20.00	10.00
6 Exc. caissons, El. 600 to 540.	2,500 c. y.	28.00	35.00	13.00
7. Exc. caissons, below El. 540.	1,600 c. y.	28.00	55.00	49.70
8. Exc. rock, open cut	4,500 c. y.	1.00	2.75	3.00
9. Exc. rock, comp. air	250 c. y.	28.00	35.00	90.00
10. Timber	45 M.b.m.	32.00	135.00	135.00
11. Embanking	25,000 c. y.	.29	.15	.70
12. Masonry conc., free air	7,000 c. y.	10.00	17.00	15.00
13. Masonry conc., comp. air	700 c. y.	25.95	18.00	30.00
14. Bitum. cure, conc.	8,000 s. y.	.32	.20	.50
15. Pump. equip. caissons. capacity	10,000 g.p.m	3.25	1.70	2.72
16. Pump. equip., deep wells, capacity	5,000 g.p.m.	5.20	4.00	4.50
17. Pumping	200,000 mil.gal.ft.	.08	.15	.15
18. Drill holes, rock	500 l. f.	1.00	5.75	11.00
19. Mix. place grout	200 c. y.	1.62	19.00	9.00
20. Portland cement	17,000 bbl.	3.67	2.70	2.26
21. Crushed stone, gravel	600 c. y	1.62	7.50	7.00
22. Sand, filters, grout	300 c. y.	2.18	4.30	3.00
23. Struct. steel	50,000 lb.	.15	.10	.08
24. Steel, reinf. conc	500,000 lb.	.065	.07	.06
25. Misc. metal work	200,000 lb.	.21	.15	.25
26. Steel pipes, fitting	400,000 lb.	.08	.05	.10
27. C. I. pipes, fitting	12,000 lb.	00.05	00.14	00.08
28. Furnish, place well points	500 l. f.	15.17	12.25	3.00
29. Rubble paving, mortar	1,300 c. y.	4.50	15.00	15.00
30. Vitrified pipe	1,800 l. f.	2.78	.50	1.50
31. Chlorinators	2 ea.	5,000.00	3,900.00	5,000.00
32. Liquid chlorine	1,500 lb.	.16	.09	.15
33. Engineer's office	500 s. f.	4.82	9.80	12.00
34. Sanitary services	l. s.	19,000.00	11,000.00	8,229.00
35 Clean up	l. s.	800.00	2,000.00	5,530.50

RESURFACING NEPAUG DAM, CONN.

OWNER: Board of Contract & Supply, Hartford, Conn.; C. M. Saville, engineer.

PROJECT: Resurfacing 25,000 sq. ft. of spillway section with reinforced Gunite, possibly also including similar resurfacing on 5,000 sq. ft. of non-overflow section, on the Nepaug Dam in New Hartford, Conn.

BIDS: Four bids were opened in July 1937 ranging from the low of $15,978 to a high of $30,535, with materials furnished by the owner and contract completion scheduled for $3\frac{1}{2}$ months after award of contract. Bidding was confined specifically to those contractors having experience with and equipment for Gunite work.

LOW BIDDERS:

1. Pneumatic Concrete Co., Edgewood, R. I.	$15,978
2. Cement Gun Co., Allentown, Pa	24,538
3. Wirts Co., New York, N. Y	25,696

Item	Quan.	Unit Prices		
		(1)	(2)	(3)
1. Overflow section cement	4,250 bag	$2.15	$3.27	$3.214
2. Mesh reinforcing	20,000 lb	.125	.15	.2214
3. Copper	2,000 lb.	.55	.82	.6679
4. Non-overflow section cement	1,000 bag	2.60	5.00	5.123
5. Mesh reinforcing	4,000 lb.	.16	.25	.283

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UNIT BID PRICES—DAMS

RUBY DAM, SEATTLE

OWNER: Board Public Works, Seattle, Wash.; J. D. Ross, Engineer.

PROJECT: Construction of 150-ft. high concrete arch dam on Ruby Creek, Skagit River near Ruby, Wash.

BIDS: Contract was awarded based on receipt of one bid only in July, 1937, of $3,967,785, with completion scheduled for June, 1939. Seattle minimum hourly wages prevail. The owner furnishes cement, awarded at $529,767, and the mechanical equipment required in the dam operation.

LOW BIDDERS:

1. General Construction Co., Seattle, Washington, Columbia Construction Co., Bonneville, Ore., and J. F. Shea, Portland, Ore., combined (contract) $3,967,785

The contract for cement was awarded to Superior Portland Cement Co., Seattle, Washington, in the amount of $529,767.

Item	Quan.	Unit Prices
1. River diversion	L. S.	$700,000.00
2. Rock excav. above el. 1,180	80,000 c. y.	5.00
3. Rock excav., el. 1,050 to 1,180	100,000 c. y.	5.40
4. Rock excav. below el. 1,050	5,000 c. y.	10.00
5. Common excav. above el. 1,180	2,000 c. y.	3.00
6. Common excav. below 1,180	42,000 c. y.	3.00
7. Rock excav. bypass tunnel	15,000 c. f.	1.20
8. Rock excav. adit	19,000 c. f.	.50
9. Grout holes, 1½ in. to 30 ft.	1,500 l. f.	3.00
10. Grout holes, 1½ in. to 50 ft.	5,000 l. f.	3.00
11. Grout holes, 1½ in. to 100 ft.	800 l. f.	3.00
12. Grout holes, 1½ in. to 150 ft.	1,000 l. f.	3.00
13. Grout holes, 1½ in. to 500 ft.	1,500 l. f.	3.00
14. Black welded steel pipe, 1½ in	2,000 l. f.	.40
15. Black welded steel pipe, 2 in	200 l. f.	.60
16. Black welded steel pipe, 2½ in	500 l. f.	.80
17. Black welded steel pipe, 3 in	3,800 l. f.	1.00
18. Valves, fdt. grt. pipe, 1½ in	10 ea.	10.00
19. Valves, fdt. grt. pipe, 2 in	10 ea.	15.00
20. Valves, fdt. grt. pipe, 2½ in.	10 ea.	15.00
21, Valves, fdt. grt. pipe, 3 in.	10 ea.	35.00
22. Fdt. pressure grouting	1,000 c. f.	3.00
23. Pressure grouting, bypass tunnel	250 c. f.	4.00
24. Drainage holes to 50 ft	3,000 l. f.	4.00
25. Drainage holes to 100 ft	500 l. f.	4.00
26. Drainage holes to 150 ft	500 l. f.	4.00
27. Blk. welded steel pipe, dam fdt., 3 in.	500 l. f.	1.00
28. Blk. welded steel pipe, dam fdt., 4 in.	8,000 l. f.	1.30
29. Porous conc. drain, 8 in	2,300 l. f.	1.00
30. Porous conc. drain, 20 in. split	1,200 l. f.	4.00
31. Concrete, Cl. A	235,000 c. y.	6.75
32. Concrete, Cl. A, galleries	6,000 c. y.	6.75
33. Concrete, Cl. B	30,000 c. y.	6.75
34. Concrete, Cl. C	1,000 c. y.	20.00
35. Concrete, Cl. D	600 c. y.	20.00
36. Concrete, Cl. A, bypass tunnel	3,000 c. y.	20.00
37. Concrete, Cl. E	600 c. y.	67.5
38. Admixtures	6,000 lb.	.10
39. Copper water seals, 15 in	3,000 l. f.	2.00
40. Copper water seals, 10 in	17,000 l. f.	1.50
41. Galv. iron grt. stops	2,500 l. f.	1.00
42. Gal. stl. pipe, ½ in., grt. contraction	15,000 l. f.	.20
43. Gal. stl. pipe, 1½ in. grt. contraction	6,500 l. f.	.40
44. Valves, 1½ in. grt. contraction jts	60 ea.	10.00
45. Galv. grout units	1,300 ea.	1.50
46. Reinforcing steel	300,000 lb.	.07
47. Install gates, hoists, trash racks, etc	50,000 lb.	.05
48. Install butterfly valves, 60 in. (2)	40,000 lb.	.05
49. Install bypass tunnel steel pipe	600,000 lb.	.06
50. Anchor holes, bars, hangers	200 l. f.	3.00
51. Anchor bars, hangers	500 lb.	.20
52. Metal conduit, sherardized, to 1¼ in	1,000 l. f.	.50
53. Metal conduit, sherardized, to 3 in	1,000 l. f.	1.00
54. Metal conduit, sherardized, 3½ in	500 l. f.	2.00
55. Elec. metal panel, pull boxes, over 10½ in	1,000 lb.	.50
56. Elec. wiring, to No. 12 A. W. G	3,000 l. f.	.10
57. Elec. wiring, to No. 8 A. W. G	1,500 l. f.	.20
58. Lamp bases, outlet boxes, 125 volt	25 ea.	2.00
59. Plug receptacles, 125 v. s. p	10 ea.	3.00
60. Plug receptacles, 30 amp., 3 ph., 250 volt	10 ea.	3.50
61. Cable, resist. thermometers, strain, jt. meters	7,500 l. f.	.20

DAM NO. 25, MISSISSIPPI RIVER

OWNER: U. S. War Department; Lt. Col. P. S. Reinecke, District Engineer, St. Louis, Mo.

PROJECT: Construction of Dam No. 25 as part of the upper Mississippi navigation system, near Cap au Gris, Mo., 61.5 miles above St. Louis.

BIDS: Five bids were opened May 18, 1937, ranging fr the contract low of $3,383,460 to a high of $3,750,631.

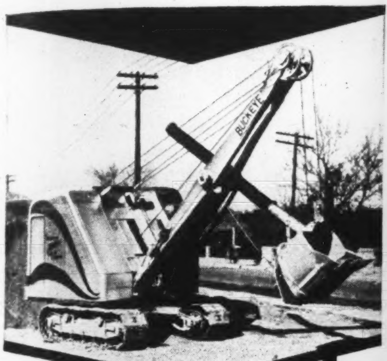
CONDITIONS: Completion is scheduled for 810 days aft contract award; wage rates specified.

LOW BIDDERS:

1. United Construction Co. (contract) Winona, Minn.......................... $3,383,4
2. Central Engineering Co. Davenport, Ia..... 3,523,4
3. Warner Construction Co. Chicago, Ill..... 3,574,9

Item	Quan.	Unit Prices		
		(1)	(2)	(3)
1. Cofferdam	1,333 l. f.	$337.84	$328.00	$414.00
2. Excav., to 50,000 c. y	50,000 c. y.	.01	.36	1.12
3. Excav, to 75,000 c. y	25,000 c. y.	.01	.35	.105
4. Excav., to 100,000 c. y	25,000 c. y.	.01	.34	.105
5. Excav. plus item 4	25,000 c. y.	.01	.32	.105
6. Fill, to 25,000 c. y	25,000 c. y.	.10	.31	.435
7. Fill, to 50,000 c. y	25,000 c. y.	.10	.30	.16
8. Fill, to 75,000 c. y	25,000 c. y.	.08	.29	.16
9. Fill, to 100,000 c. y	25,000 c. y.	.08	.28	.16
10. Fill, to 125,000 c. y	25,000 c. y.	.06	.27	.16
11. Fill, plus item 10	25,000 c. y.	.06	.26	.16
12. Embankment, dike	100,000 c. y.	.21	.36	.487
13. Embankment, plus item 12.	25,000 c. y.	.10	.35	.24
14. Embankment, plus item 13.	25,000 c. y.	.08	.34	.24
15. Embankment, plus item 14.	25,000 c. y.	.06	.32	.24
16. Embankment, plus item 15.	25,000 c. y.	.06	.31	.24
17. Pile, timber	212,730 c. y.	.70	.63	.55
18. Pile, concrete	3,000 c. y.	1.68	3.05	4.15
19. Pile, steel sheet, MA–31	70,000 s. f.	1.64	1.39	1.45
20. Pile, steel sheet, MA–22	45,250 s. f.	1.23	1.18	1.20
21. Pile, steel sheet, MA–22U	119,600 s. f.	.60	.88	.79
22. Pile, steel sheet, Z–38	5,700 s. f.	2.10	1.67	1.81
23. Pile loading test	5 each	603.50	575.00	1,950.00
24. Timber, soft wood, creosoted	4.8 M.b.m.	300.00	175.00	600.00
25. Lumber, mattress	297 M.b.m.	80.00	85.00	75.00
26. Stone protection, derrick	10,700 c. y.	5.00	5.75	5.15
27. Stone protect. 1 & 2 man	16,500 c. y.	4.30	5.25	6.10
28. Stone protect. rip rap	3,130 c. y.	4.00	3.75	4.57
29. Stone protect. gravel	6,820 c. y	2.52	2.95	4.52
30. Stone protect. stored	5,000 c. y.	3.23	4.50	4.80
31. Stone protect. rehandled	2,500 c. y.	.75	.75	2.46
32. Concrete, slushing	1,290 c. y.	20.75	9.75	20.00
33. Concrete, Cl. A	1,920 c. y	27.37	24.50	20.00
34. Concrete, Cl. B	48,900 c. y.	12.63	14.75	12.42
35. Struc. steel, serv. bridge	1,775,000 lb.	.084	.09	.08
36. Struc. steel, tainter gate	3,027,000 lb.	.091	.096	.096
37. Struc. steel, roller gate	482,500 lb.	.105	.119	.12
38. Struc. steel, phos. chro., gate	580,500 lb.	.137	.116	.12
39. Struct. steel, misc	1,067,000 lb.	.105	.08	.092
40. Struct. steel, high tensile	359,500 lb.	.13	.093	.10
41. Struct. steel, phos. chro	277,400 lb.	.105	.079	.08
42. Struct. steel, nickel	147 lb.	.21	.56	.56
43. Steel, conc. reinf	1,283,000 lb.	.065	.05	.062
44. Steel, corr. resisting	71,400 lb.	.75	.614	.614
45. Steel, cold rolled	912 lb.	.17	.126	.13
46. Forgings, steel	57,100 lb.	.14	.145	.165
47. Forgings, alloy steel	130,800 lb.	.20	.176	.176
48. Forgings, phos-chro. steel	20,300 lb.	.245	.338	.36
49. Castings, steel, Cl. O	22,100 lb.	.15	.118	.133
50. Castings, steel, Cl. 1–3	508,800 lb.	.225	.209	.21
51. Castings, alloy steel	99,100 lb.	.315	.214	.214
52. Bronze	21,700 lb.	.57	.579	.58
53. Copper	5,300 lb.	1.05	.75	.60
54. Non-ferrous metals, misc	620 lb.	.42	.373	.38
55. Steel pipe, bl. std. 2 in	220 l. f.	.75	.75	2.50
56. W. I. pipe, bl. std. 4 in	260 l. f.	3.10	2.50	3.00
57. Conduit, fiber, 4 in	142 l. f.	.60	1.20	1.08
58. Conduit, fiber, 2 in	375 l. f.	.53	.65	.90
59. Conduit, metal, 4 in	47 l. f.	6.00	1.75	3.13
60. Conduit, metal, 3 in	141 l. f.	4.13	1.20	2.18
61. Conduit, metal, 2 in	42 l. f.	3.00	1.00	1.51
62. Conduit, metal, 1½ in	1,014 l. f.	1.50	.75	1.04
63. Conduit, metal, 1¼ in	16 l. f.	1.95	.65	1.04
64. Conduit, metal, 1 in	51 l. f.	1.50	.60	.97
65. Electrical grounding system	total	263.00	475.00	247.00
66. Crane track, 80 lb. rail	1,518 t. f.	3.75	6.84	6.84
67. Storage yd. track, 60.5 lb	392 t. f.	3.10	4.19	4.20
68. Handrail, steel pipe, 2 in	2,215 l. f.	2.55	3.30	3.30
69. Post, safety chain	6 each	24.00	32.80	65.00
70. Floor grating, steel, 1 in	110 s. f.	1.60	1.73	2.73
71. Floor grating, steel, 1¼ in	3,230 s. f.	1.47	1.50	1.50
72. Floor plate, ½ in	720 s. f.	1.15	1.10	1.10
73. Floor plate, 5/16 in	17,400 s. f.	1.15	1.02	1.02
74. Rubber seals, moulded	17,800 lb.	.84	1.06	1.06
75. Rope, cotton	330 lb.	.84	1.06	1.06
76. Operat. machinery, roller gate	3 ea.	33,000.00	28,636.00	28,636.00
77. Roller gate spare parts	L. S.	5,985.00	3,990.00	3,990.00
78. Roller gate operat. machinery	L. S.	14,910.00	11,500.00	11,500.00
79. Roller gate operat. house	4 ea.	4,800.00	5,500.00	4,650.00
80. Operat. machinery, tainter gate	14 ea.	19,000.00	19,380.00	19,380.00
81. Tainter gate operat'g. machinery	total	12,075.00	11,440.00	11,440.00
82. Gate heaters, tainter, complete	total	630.00	450.00	450.00
83. Gate heaters, roller, complete	total	3,990.00	3,810.00	3,810.00
84. Gate heater, spare parts	total	525.00	800.00	800.00
85. Install locomotive train	total	1,000.00	1,500.00	1,825.00
86. Install trucks in stor. yd	total	100.00	150.00	115.00
87. Store pick-up booms	total	25.00	25.00	10.00
88. Superstructure, Pier 21	total	4,743.00	5,775.00	6,000.00
89. Pressure grouting, mortar	1,500 c. y.	1.00	1.75	3.45
90. Temp. storage bldg	total	500.00	275.00	1,135.00

FOUR WAYS TO *Lower Costs*



Buckeye Clipper

CONVERTIBLE
EXCAVATORS
with "MEVAC"
METERED VACUUM
CONTROL

½ YD.
⅝ YD.
¾ YD.

SHOVEL – DRAGLINE
TRENCH HOE – CLAMSHELL
CRANE – PILE DRIVER

Results produced by this machine cannot be attributed to any one feature of Clipper design alone—but among the many contributing factors, the most outstanding is the new Buckeye "MEVAC" Control that takes shovel operation out of the field of manual labor.

Speed with the Clipper is the result of saving in time.

The operator soon develops unusual skill to make every move count . . He has no heavy control levers to swing—no resulting fatigue to take the edge off his skill. The Clipper is the kind of job operators want. See it before you buy any excavator this year.

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dig anywhere

Your Solution TO THE WATER AND SMALL SEWER DITCHING PROBLEM

With power and rugged strength that cuts thru any soil, and the neat maneuverability given the machines by their shiftable booms, Buckeye chain type ditchers, Models 120 and 160 for trench 16″ to 42″ wide and to 12′6″ deep, lick the toughest jobs with ease. Know what a Buckeye can do on your next ditching job—before you bid or start work.

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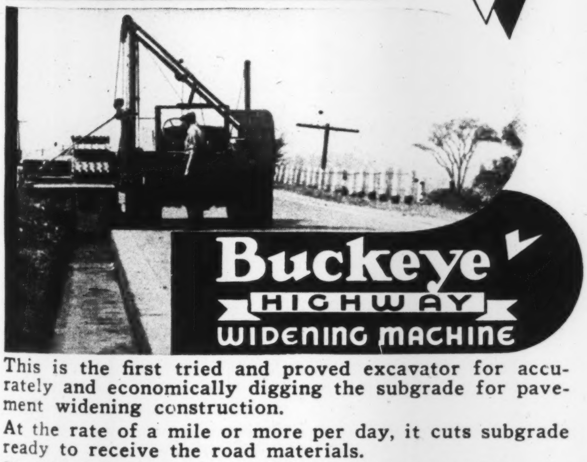

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This is the first tried and proved excavator for accurately and economically digging the subgrade for pavement widening construction.

At the rate of a mile or more per day, it cuts subgrade ready to receive the road materials.

Model 16-R cuts 12″ to 27″ wide. Model 16-R-4 cuts 12″ to 48″ wide—two or more cuts give any widths needed. Write for complete data.

Buckeye Surface Material SPREADER

"IT ABSOLUTELY WASTES NO STONE OR SLAG"

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"ACCURATE TO THE POUND PER SQUARE YARD"

An Ohio contractor makes these statements after using the Buckeye Surface Material Spreader on County maintenance work. Others from coast to coast and Canada to Mexico make equally convincing reports of its value to them on surfacing work.

Write for data and prices before you invest in spreaders this year.

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QUOTED STATEMENTS are authentic—we file the original reports received from users for proof of quotations used in our advertising.

BID THE Buckeye WAY
ask for our operation data before you bid

OTHERS SAY

"We know there is no other machine as accurate."

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"The Buckeye is the only spreader I have ever seen that can be controlled perfectly."

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"It is the best spreader I have ever seen in more ways than one."

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"Accuracy — time saved — but most important is — it satisfies engineers."

•

THE BUCKEYE TRACTION DITCHER COMPANY
FINDLAY, OHIO

UNIT BID PRICES—DAMS

SAN GABRIEL DAM SPILLWAY

OWNER: Los Angeles County Flood Control District; C. H. Howell, Chief Engineer, Paul Baumann, Dam Engineer.

PROJECT: Construction of spillway 500 ft. long, 300 ft. wide, for San Gabriel dam No. 1, in San Gabriel Canyon, 9 mi. north of Azusa, Cal.

BIDS: Eight bids were opened April 27, 1937, ranging from the contract low of $314,170 to a high of $452,701, with contract awarded May 4, 1937. Completion schedule 120 days.

CONDITIONS: Transportation is available by rail and highway from Azusa. Minimum daily wage rates are stipulated at $11.00 for skilled and $5.00 for common labor. Contractor furnishes all material exclusive of cement, admixture, reinforcing steel, mesh, misc. metalware, seals, fillers, bituminous materials, drainage tile, cast iron pipe and burlap, and all fence materials other than wire.

LOW BIDDERS:

1. Gogo & Rados, Los Angeles, Calif. (contract)	$314,170
2. Atlas Const. Co., Pasadena, Calif.	315,158
3. Stroud, Seabrook & Co., Bakersfield, Calif.	380,015

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Cutoff excav., Cl. A	3,150 c. y.	$2.50	$3.00	$5.00
2. Cutoff excav., Cl. B	2,200 c. y.	3.00	4.00	6.00
3. Cutoff excav., Cl. C	1,150 c. y.	3.50	4.25	7.00
4. Cutoff excav., Cl. D	850 c. y.	4.00	4.50	8.00
5. Cutoff excav., Cl. E	420 c. y.	4.50	5.00	8.00
6. General excav., Cl. F	52,000 c. y.	.60	1.00	1.50
7. Speciel excav., Cl. G	2,000 c. y.	2.75	4.00	4.00
8. Concrete, Cl. A	6,900 c. y.	5.00	5.75	6.00
9. Concrete, Cl. B	9,600 c. y.	7.00	5.60	8.40
10. Concrete, Cl. C	2,000 c. y.	19.00	17.50	18.00
11. Concrete, Cl. D	5,200 c. y.	7.50	7.00	7.00
12. Concrete, Cl. E	160 c. y.	25.00	13.00	8.00
13. Gunite, slab, 6 in	11,000 s. f.	.32	.30	.23
14. Gunite, slab, 2 in	10,000 s. f.	.11	.15	.15
15. Place reinforcing steel	856,000 lb.	.01	.015	.01
16. Place anchor bars	5,300 l. f. hole	.60	.20	.25
17. Drainage gravel	4,000 c. y.	1.95	1.75	2.50
18. Backfill	14,000 c. y.	1.50	.50	1.00
19. Place tile drains	5,600 l. f.	.15	.30	.20
20. Place water seals	6,800 l. f. seal	.10	.25	.05
21. Drill grout holes	8,200 l. f.	1.50	1.00	.30
22. Grouting	4,400 c. f.	1.50	1.00	.80
23. Drill weepholes, 2 in	700 l. f.	.50	1.00	.40
24. Asphalt paving	22,000 s. f.	.12	.20	.15
25. Place fencing	700 l. f.	.10	1.25	.25
26. Place metalware, misc	40,000 lb.	.05	.06	.04
27. Place joint fillers	8,500 s. f.	.04	.25	.05

CROOKED CREEK DAM, PA.

OWNER: U. S. Engineer Dept., Pittsburgh; Col. W. E. R. Covell, district engineer.

PROJECT: Crooked Creek earthfill dam on Crooked Creek, Allegheny River watershed, near Ford City, Pa., Ohio River flood control project. Embankment is rolled fill 143 ft. high and 1,480 ft. long, with rockfill toes. Outlet works include tunnel 15.5 ft. dia., 1,320 ft. long; intake gates; needle valves. Spillway cut in saddle, 2,700 ft. long, from 250 to 390 ft. wide. Concrete cutoff wall 20 ft. into rock full length of fill.

CONDITIONS: Diversion of stream will be through tunnel and outlet works. Contract time limit, 1,096 calendar days, penalty $300 per day. Government furnishes conduit lining, gates, valves, operating machinery, permanent pumps, f.o.b. Ford City. Contractor furnishes all other materials (note cement is separate contract item). Government pays for damage to permanent structures caused by floods overtopping cofferdam built to designated height. Fill to be placed in layers 6 in. uncompacted thickness and rolled to desired compaction. Minimum wage rates, 65c. to $1.30. Government assumes cost of new state or federal taxes imposed on contractors after bids are opened.

BIDS: Fourteen bids opened on Dec. 17, 1937, ranging from $2,367,511 to $3,424,600. Engineer's estimate, $3,219,239

LOW BIDDERS:

*1. Geo. M. Brewster & Son, Inc., Bogota, N. J.	$2.367.511
2. Dravo Contr. Corp., Pittsburgh	2.536.960
3. Central Penn. Quarry Stripping and Const. Co., Hazelton, Pa	2.541.510

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Cofferdam	L.S.	$15,000.00	$55,000.00	$50,000.00
2. Remove exist. struct.	L.S.	32,000.00	6,000.00	3,500.00
3. Clear, grub dam site	L.S.	44,000.00	5,500.00	3,500.00
4. Stripping	3,400 c.y.	.33	.70	.35
5. Common excav	660,000 c.y.	.23	.31	.29
6. Excav. pit A	300,000 c.y.	.20	.30	.22
7. Excav. pit B	50,000 c.y.	.25	.30	.19
8. Gunite	4,000 c.f.	1.30	.60	.50
9. Rock excav	650,000 c.y.	.80	.65	.62
10. Special rock excav	26,000 c.y.	2.70	3.00	3.25
11. Rock excav. trench	4,000 c.y.	3.25	9.00	5.00
12. Tunnel excav	17,000 c.y.	8.30	10.00	10.50
13. Steel timbering, tunnel	410,000 lb.	.10	.11	.115
14. Rock channeling or line drill	10,000 s.f.	.45	1.00	.65
15. Rock treatment	1,500 sqs.	.60	3.00	1.30
16. Uncompacted backfill	4,000 c.y.	.10	.50	.45
17. Compacted backfill	8,500 c.y.	.90	1.50	.75
18. Rolled fill embank	950,000 c.y.	.07	.06	.11
19. Rock embank	430,000 c.y.	.10	.11	.12
20. Select rock embank	65,000 c.y	.13	.15	.55
21. Rolling each add. 3 trips	200,000 sqs.	.0001	.015	.025
22. Top soil	30,000 c.y.	.25	.40	.85
23. Seeding	40 acre	75.00	140.00	80.00
24. Gravel filters, drains	12,000 c.y.	1.50	1.25	1.20
25. Rock paving	1,900 c.y.	2.15	4.00	8.00
26. Rock paving, gutters	20 c. y.	4.00	8.00	8.00
27. Road surfacing	8,500 s.y.	1.00	1.70	2.10
28. Diamond core drilling	58,000 l.f.	1.40	1.50	1.50
29. Drill holes, rock or conc.	900 l.f.	.60	.90	.50
30. Furnish cement	90,000 bbl.	2.40	2.10	2.30
31. Reinf. steel	2,600,000 lb.	.05	.05	.04
32. Pressure grouting	75,000 sax	.55	.80	.60
33. Concrete, struc. cl. A	500 c.y.	28.80	25.00	15.50
34. Concrete, struc. cl. B	18,000 c.y.	11.60	15.00	13.25
35. Concrete, spillway	22,000 c.y.	7.55	8.00	9.42
36. Concrete, tunnel	8,000 c.y.	8.75	12.00	14.50
37. Concrete, grout cap	1,000 c.y.	5.30	10.00	9.22
38. Grouting recesses	560 c.y.	17.65	20.00	20.65
39. Install equip. furn. by govt	650,000 lb.	.02	.02	.03
40. Steel for bridge	410,000 lb.	.08	.10	.0775
41. Misc. ironwork	95,000 lb.	.15	.20	.15
42. Wrought iron pipe	13,000 lb.	.16	.22	.21
43. Black steel pipe	50,000 lb.	.14	.20	.18
44. Cast iron pipe	150,000 lb.	.09	.08	.08
45. Copper water stops	10,000 lb.	.50	.50	.60
46. Electric conduits	L.S.	3,500.00	3,500.00	4,700.00
47. Misc. brass and bronze	200 lb.	1.00	1.00	.70
48. Power and light system	L.S.	7,000.00	5,000.00	4,950.00
49. Oper. house superstr.	L.S.	35,000.00	35,300.00	43,000.00
50. Highway guard rail	14,000 l.f.	.80	1.00	.70

EARTH IRRIGATION DAM, NEB.

OWNER: Central Nebraska Public Power & Irrigation District; Geo. E. Johnson, Chief Engineer, Hastings, Neb.

PROJECT: Construction of Middle Diversion Dam of Tri-County Project for Central Nebraska Public Power and Irrigation District, including dikes, canals, intake and head gates, and all appurtenant items.

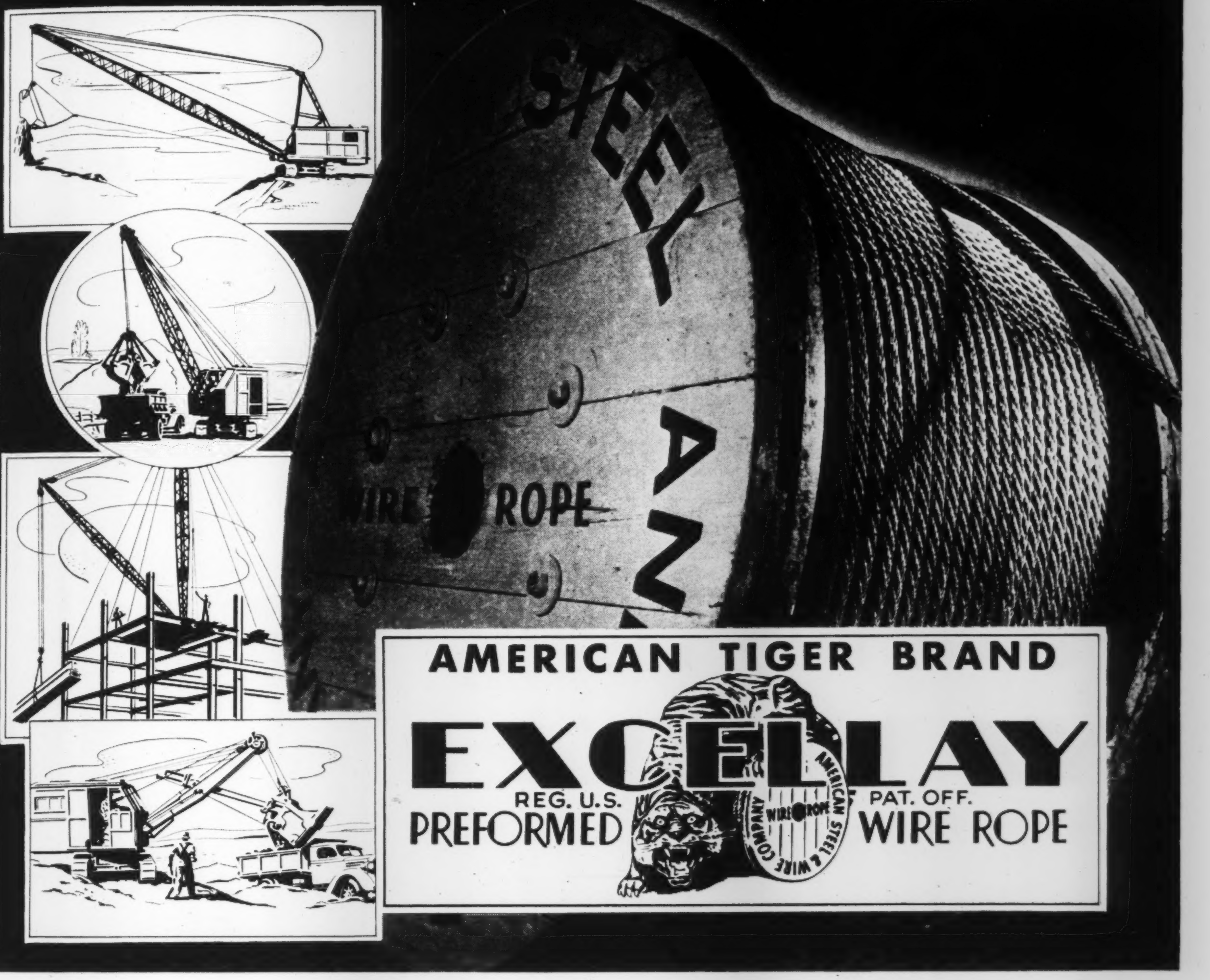
BIDDERS: Six bids were opened in July, 1937, ranging from $27,249 to $35,213. The contractor furnishes all labor and materials required in the construction.

LOW BIDDERS:

1. Zybach and Sokol, Columbus, Nebr.	$27.249
2. Inland Construction Co., Omaha, Nebr.	28.781
3. John W. Towle, Omaha, Nebr.	31,036

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Pumped fill, dikes	40,000 c. y.	$0.15	$0.14	$0.17
2. Canal excav	65,000 c. y.	.115	.10	.14
3. Structure excav	400 c. y.	.50	.60	2.00
4. Puddled backfill	30 c. y.	1.00	.60	2.00
5. Backfill, compacted	80 c. y.	1.00	.70	2.00
6. Apron subgrade	164 c. y.	1.00	1.50	2.00
7. Wood sheetpiling	14,200 s. f.	.45	.70	.57
8. Untreated timber	58 M.b.m.	90.00	88.00	61.00
9. Misc. iror	3,350 lb.	.10	.12	.10
10. Deadman assemblies	16 ea.	5.00	10.00	6.00
11. Hand hoists, 5 ton	1 ea.	150.00	140.00	100.00
12. Clearing	2.5 acre	200.00	50.00	325.00
13. Grubbing	2.5 acre	250.00	100.00	325.00

Excellay *Preformed* Wire Rope reduces equipment operating costs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UNITED STATES STEEL

UNIT BID PRICES—HIGHWAYS

COLORADO HIGHWAYS

OWNER: U. S. Bureau Public Roads; J. A. Elliott, Engineer, Denver, Colo.

PROJECT: Grading and draining 2.027 miles of 28 ft. roadway on Boulder-Idaho Springs Highway, Roosevelt National Forest; base surfacing 1.242 miles of 26-ft. roadbed on Berthoud Pass Highway, Arapaho National Forest.

BIDDERS: Eleven bids were opened for the first project, and six for the second on August 17, 1937, with proposals ranging respectively from $86,691 to $110,907, and from $34,958 to $51,127.

LOW BIDDERS:

I—Boulder-Idaho Springs Highway

1. Hamilton-Gleason Co., Denver, Colo. (contract)	$86,691
2. Platt, Rogers, Inc., Pueblo, Colo.	88,429
3. Pioneer Constr. & Engr. Corp., Denver, Colo.	89,700

II—Berthoud Pass Highway

1. DeRemer & Atchison, Denver, Colo. (contract)	34,958
2. Brown-Schrepferman & Co., Denver, Colo.	38,757
3. Blanchard Bros., Denver, Colo.	43,288

I — BOULDER-IDAHO SPRINGS HIGHWAY

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clear	16 acre	$50.00	$75.00	$70.00
2. Grub	8 acre	25.00	50.00	50.00
3. Excav. unclass.	134,000 c. y.	.48	.50	.50
4. Excav. structural, unclass.	600 c. y.	1.00	1.50	1.25
5. Excav. borrow, unclass.	8,000 c. y.	.35	.30	.40
6. Overhaul	180,000 c. y.	.02	.02	.02
7. Finish earth graded road	2.151 mile	400.00	300.00	250.00
8. Concrete, cl. A	263 c. y.	23.00	20.00	22.00
9. Reinf. steel	28,300 lb.	.06	.06	.065
10. Stone masonry, cem. cl. A.	60 c. y.	23.00	20.00	17.00
11. C. g. s. m. pipe, 24 in.	860 l. f.	2.75	2.50	2.85
12. C. g. s. m. pipe, 30 in.	56 l. f.	3.30	3.50	3.70
13. C. g. s. m. pipe, 36 in.	244 l. f.	5.10	5.00	5.45
14. Perf. c. g. s. m. pipe, 6 in.	300 l. f.	1.50	1.50	1.10
15. Conc. maintenance posts	12 ea.	7.00	5.00	6.00

II — BERTHOUD PASS HIGHWAY

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excav. unclass.	6,200 c. y.	$0.60	$0.40	$0.60
2. Structural excav. unclass.	500 c. y.	2.50	3.00	2.00
3. Special overhaul	16,000 sta. y.	.02	.02	.05
4. Special overhaul	1,600 c. y.	.15	.20	.20
5. Heavy base course, No. 3	35,000 ton	.45	.60	.70
6. Watering	1,000 m. gal.	3.00	1.50	2.00
7. Roller operation	300 hr.	3.50	3.00	4.00
8. Furnish roller	1 ea.	500.00	350.00	100.00
9. Water plant	1 s.	100.00	150.00	100.00
10. Crusher run top course	3,000 ton	.75	1.00	.90
11. Concrete, cl. A	132 c. y.	22.50	22.50	22.50
12. Reinf. steel	12,300 lb.	.06	.07	.06
13. Stone masonry, cement cl. A	20 c. y.	22.50	30.00	30.00
14. C. g. s. m. pipe, 24 in.	496 l. f.	2.75	3.50	2.75
15. C. g. s. m. pipe, 30 in.	68 l. f.	3.50	4.00	3.50
16. Cast iron frames, gratings	650 lb.	.10	.10	.07
17. Conc. maintenance posts	7 ea.	7.50	5.00	6.00
18. Remove old structures	L. S.	750.00	350.00	600.00
19. Relay c. g. s. m. pipe	150 l. f.	1.00	1.00	2.00

BITUMINOUS MACADAM PAVING, SYRACUSE, N. Y.

OWNER: City of Syracuse, Wm. Cronin, Engineer.

PROJECT: Construction of 10,080 sq. yd. sheet asphalt pavement with 8 in. concrete base on Comstock Avenue from Madison to Euclid Avenue, including 11,940 sq. yd. grading, 1860 sq. yd. sandstone block, and base reinforcing.

BIDS: Three bids were opened May 17, 1937, ranging from the contract low of $45,444 to a high of $57,602.

CONDITIONS: All materials are to be furnished by the contractor; completion is scheduled for 75 days after award; minimum hourly wage rates stipulated of 90 c. for skill and 50 c. for common labor.

LOW BIDDERS:

1. Cleveland Trinidad Co., Syracuse, N. Y. (contract)	$45,444
2. Street Bros. Const. Co., Syracuse, N. Y.	51,380
3. Dale Engineering Co., Utica, N. Y.	57,602

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Sheet asphalt	10,080 s. y.	$2.70	$2.95	$3.12
2. Sandstone block relaid	1,860 s. y.	3.68	4.95	5.25
3. Grading	11,940 c. y.	.34	.27	.42
4. Concrete curb	350 l. f.	.60	1.00	1.00
5. Catch basin lip, reconstruct	10 l. f	.25	.40	.40
6. Curved Medina curb	100 l. f.	1.50	1.90	2.00
7. Curb reset	1,000 l. f.	.50	.80	.88
8. Headers	10 l. f.	1.00	1.25	1.00
9. Headers reset	20 l. f.	.50	.80	.50
10. Catch basins, type A	9 each	70.00	85.00	75.00
11. Earth refill	10 c. y.	1.25	1.50	2.00
12. Gravel	10 c. y.	1.90	2.00	2.50
13. Concrete sidewalk	2,000 s. f.	.20	.22	.28
14. Concrete driveways	1,000 s. f.	.30	.30	.40
15. Concrete steps, coping	10 l. f.	2.00	2.75	2.00
16. Concrete steps only	10 l. f.	1.75	2.50	1.75
17. Sewer pipe, 4 in.	200 l. f.	.73	1.00	.75
18. Sewer pipe, 6 in.	20 l. f.	1.17	2.00	2.50
19. Sewer pipe, 10 in.	200 l. f.	1.38	2.25	2.50
20. Manhole, 3 x 4 ft	6 each	75.00	90.00	90.00
21. Manhole tops	12 each	20.00	22.50	20.00
22. Brick masonry	12 l. f.	5.00	6.00	6.00
23. Grade Adams St. west	L. S.	50.00	20.00	100.00
24. Extra asphalt binder	20 ton	6.00	7.50	6.50
25. Extra concrete, 1:3:6	20 c. y.	9.00	9.00	9.00
26. Excavate concrete base	20 c. y.	1.00	1.75	2.50
27. Asphalt surface	200 s. y.	1.00	1.20	1.50
28. Hillside brick surface	20 s. y.	3.25	3.50	3.00
29. Sandstone block	20 s. y.	4.50	3.50	4.00
30. Vitrif. brick relaid	50 s. y.	2.50	2.50	3.00
31. Reinforcing steel	1,500 l. f.	.06	.07	.05
32. Mesh reinforcing	123,500 s. f.	.02	.025	.04
33. Calcium chloride	0.25 ton	35.00	30.00	35.00
34. Std. seal traps	7 each	10.00	10.00	8.50

PENNSYLVANIA HIGHWAYS

OWNER: State Highway Department, Harrisburg, Pa.

PROJECT: Construction of reinforced concrete bridge, 2,387 ft. long, 538 ft. of reinforced concrete pavement, widening existing pavement and 212 ft. shoulder grading, in Northumberland Co. Shamokin Twp.

BIDS: Six bids were opened in September, 1937, ranging from a low of $45,765 to a high of $54,506.

LOW BIDDERS:

1. Angelo Christiana, Shamokin, Pa.	$45.765
2. Paul E. Rarick, Zions Grove, Pa.	47,522
3. D. A. Kessler Const. Co., Inc., Mt. Carmel, Pa.	48.582

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clear, grub	L. S.	$250.00	$200.00	$300.00
2. Excavation, cl. 1	22,042 c. y.	.58	.48	.60
3. Excavation, cl. 2	552 c. y.	2.00	2.25	2.00
4. Subgrade	5,949 s. y.	.12	.18	.20
5. Shoulders	2,768 l. f.	.15	.25	.25
6. Base course, nat. st., cu. agg.	620 s. y.	.90	1.10	1.00
7. Concrete pavement, H. E. S. Pl.	12 s. y.	2.50	3.00	3.00
8. Conc. pavt. RC., H. E. S.	5,317 s. y.	2.97	3.40	3.00
9. RC wearing surf., H. E. S.	175 s. y.	2.50	2.50	2.00
10. Concrete cl. A, H. E. S.	143 c. y.	21.00	22.00	24.00
11. Concrete cl. B	212 c. y.	18.00	18.00	20.00
12. Plain steel bars	33,337 lb.	.05	.05	.06
13. Plain struct. steel	1,761 lb.	.07	.09	.10
14. Temp. bridge, approach, 1 lane	L. S.	500.00	750.00	200.00
15. Cement rubble masonry	10 c. y.	15.00	15.00	18.00
16. Endwall, F. rails	1 ea.	90.00	100.00	150.00
17. Inlets, type E	2 ea.	70.00	75.00	75.00
18. Cast iron pipe, 18 in.	105 l. f.	3.00	3.50	4.00
19. Corr. metal pipe, 18 in.	42 l. f.	3.00	2.75	3.00
20. C. M. pipe, asphalt coated, 18 in.	64 l. f.	3.20	3.10	3.50
21. C. M. pipe, asphalt coated, 60 in.	62 l. f.	15.00	18.00	15.00
22. Reinf. conc. pipe, 12 in.	22 l. f.	2.00	2.25	2.25
23. Reinf. conc. pipe, 15 in.	10 l. f.	2.50	2.50	3.50
24. Plain pipe, 6 in., conc. or v.c.	26 l. f.	1.50	1.00	1.25
25. Title outlets, 4 in.	80 l. f.	1.00	.70	1.00
26. Underdrain, 4 in. por. conc. or perf. vit. clay	796 l. f.	1.00	.70	1.00
27. Subgrade drains	200 l. f.	.40	.40	.50
28. Plain conc. gutter	232 s. y.	2.40	3.00	2.50
29. Guard fence, Type 1B	768 l. f.	.60	.85	.75
30. End anchors, type AB	7 ea.	12.00	17.00	16.00
31. Bit. surface crse. HE1, HE9	75 ton	6.00	6.50	7.00

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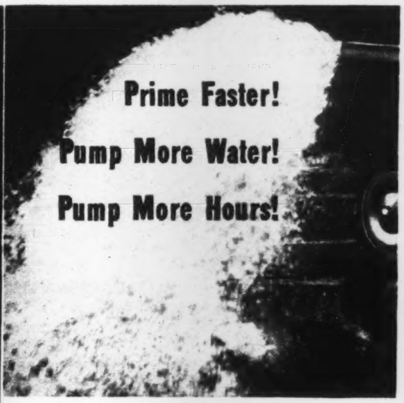

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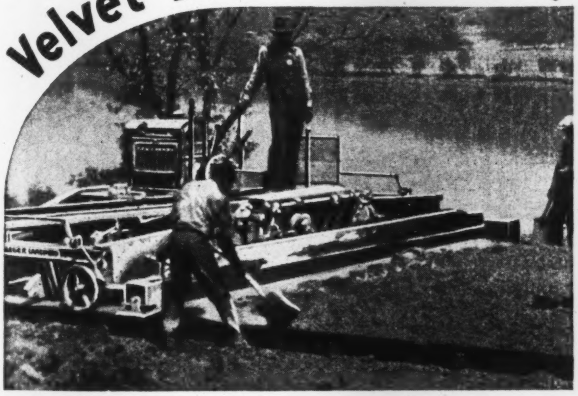

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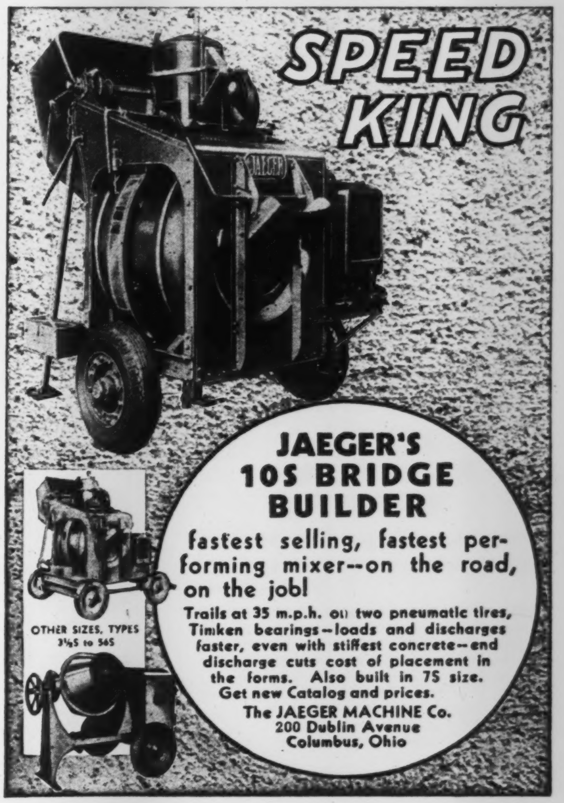

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UNIT BID PRICES—HIGHWAYS

LINCOLN TUNNEL APPROACH

OWNER: Port of New York Authority; J. C. Evans, Chief Engineer.

PROJECT: Excavation and incidental structures, Prospect Avenue, North Bergen to Bergenline Avenue, Union City, and excavation and fill between Hudson County Boulevard East and Kings Bluff in Weehawken, N. J.

BIDS: Six bids were opened in November, 1937, for Contract MHT-70, comprising the Bergenline-Prospect Avenue project, and four bids for Contract MHT-27 comprising the Weehawken project. Bids for the former ranged from $773,273 to $1,221,141; on the latter from $231,250 to $320,700.

LOW BIDDERS:

I. Contract MHT-70—Bergenline-Prospect Ave.

1. B. Perrini & Sons, Inc. Framingham, Mass... $773,273
2. Woodcrest Construction Co., New York, N. Y.. 898,896
3. Geo. M. Brewster & Son, Inc., Bogota, N. J...1,024,678

II. CONTRACT MHT-27—WEEHAWKEN-HUDSON COUNTY

1. Jos. L. Sigretto & Son, Rutherford, N. J. $231,250
2. Geo. M. Brewster & Son, Inc., Bogota, N. J. 297,400
3. Rusciano & Son Corp., New York, N. Y. 311,500

I — MHT-70—BERGENLINE-PROSPECT AVE.

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Rock excav.	174,000 c. y.	$2.37	$3.65	$3.63
2. Earth excav.	64,000 c. y.	2.37	1.00	3.63
3. Derrick placed stone	5,000 s. f.	.55	2.50	3.00
4. Concrete	1,300 c. y.	37.00	35.00	32.00
5. Structural steel	75,000 lb.	.075	.07	.06
6. Reinf. steel	45,000 lb.	.065	.07	.08
7. C. i. manhole frames, etc.	10,500 lb.	.13	.10	.11
8. Bit. conc. pavement	6,600 s. y.	2.55	2.50	2.30
9. Timber curbing	2,300 l. f.	.75	.40	.30
10. Chain link fence	800 l. f.	2.50	1.70	2.10
11. Wood fence	6,300 l. f.	2.65	3.00	2.35
12. Relink chain link fence	300 l. f.	.95	.80	1.15
13. Bridge Hudson County Boulevard	7,000 s. f.	5.50	4.00	2.90
14. Summit Avenue bridge	6,200 s. f.	10.00	7.00	3.95
15. V. c. pipe, 8 in., 10 in.	200 l. f.	.75	1.70	1.00
16. V. c. pipe, 12 in.	400 l. f.	1.15	6.43	1.30
17. V. c. pipe, 20 in.	100 l. f.	2.50	7.60	2.90
18. V. c. pipe, 24 in.	500 l. f.	3.60	8.14	5.00
19. Reinf. conc. pipe, 30 in.	150 l. f.	4.40	8.30	5.00
20. Reinf. conc. pipe, 36 in.	325 l. f.	6.90	9.50	6.30
21. Sewer flume	350 l. f.	12 00	28.50	30.00
22. Stone screenings sidewalk	1,300 s. y.	.50	.75	.45

II — MHT-27—WEEHAWKEN-HUDSON COUNTY

Item	Quan.	(1)	(2)	(3)
1. Excavation	38,000 c. y.	$6.00	$6.80	$7.00
2. Derrick placed stone	13,000 s. f.	.25	3.00	3.50

NATIONAL FOREST HIGHWAY, WYOMING

OWNER: U. S. Dept. Agriculture, Bureau of Public Roads, Denver, Colo. J. A. Elliott, dist. engineer.

PROJECT: Grading, draining, gravelling 10.443 miles of Salt Creek—Smoot National Forest Highway, Wyoming National Forest, Lincounty, Wyoming. The work includes about 7 miles of surfacing previous grading. The new grading approximates 6 in. in depth over the 22ft. road width.

BIDS: Seven proposals were opened on May 18, 1937 and ranged from a low of $84,126 to a high of $109,915.

CONDITIONS: Completion is scheduled for 150 days after award of contract with minimum hourly wage rates stipulated of $1.12½ for skilled and 55 c. for common labor.

LOW BIDDERS:

1. J. M. Sumsion, Springville, Utah............ $84,126
2. W. C. Burns, Idaho Falls, Idaho............ 84,692
3. L. A. Young Const. Co. Richfield, Utah...... 89,587

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation, unclass	55,000 c. y.	$0.495	$0.48	$0.57
2. Excav. struct., unclass	1,220 c. y.	2.50	2.00	2.50
3. Excav. borrow, unclass	2,000 c. y.	.35	.40	.30
4. Overhaul (sta. yd.)	50,000 c. y.	.03	.02	.03
5. Gravel base course, 3 in.	14,400 ton	.70	.80	.63
6. Crusher run top course	15,300 ton	.80	.80	.67
7. Supplemental crushed gravel	800 ton	.80	.70	.67
8. Watering	550 unit	3.00	1.50	3.00
9. Roller operation	20 day	24.00	30.00	20.00
10. Furnish roller	1 eac.	400.00	200.00	250.00
11. Furnish water plants	total	300.00	50.00	250.00
12. Concrete, Cl. A	363 c. y.	28.00	30.00	30.00
13. Concrete, Cl. B	46 c. y.	27.00	28.00	30.00
14. Reinforcing steel	36,100 lb.	.075	.07	.10
15. Structural steel	32,500 lb.	.085	.09	.075
16. Untreated timber	0.68 M.B.M.	130.00	100.00	120.00
17. Corr. galv. pipe, 24 in.	954 l. f.	3.50	3.50	3.50
18. Cattle guards, 10 ft.	3 ea.	350.00	800.00	800.00
19. Barbed wire fence	25,700 l. f.	.125	.10	.20
20. Gates	12 ea.	20.00	80.00	20.00
21. Remove, relay old structures	total	110.00	110.00	110.00

SOUTH DAKOTA HIGHWAYS

OWNER: U. S. Bureau Public Roads; J. A. Elliott, Engineer, Denver, Colo.

PROJECT: Bituminous surfacing of 3.978 miles of 26 ft. road bed on the Deadwood-Custer-Hot Springs Highway in Harney National Forest, South Dakota.

BIDS: Four bids were opened and contract awarded in August 1937, with proposals ranging from the low of $67,436 to a high of $75,151.

LOW BIDDERS:

1. Northwestern Engineering Co., Rapid City, S. D. (contract)........................ $67,436
2. Summit Const. Co., Rapid City, S. D......... 73,237
3. Peter Kiewit Sons Co., Omaha, Neb........ 74,963

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excav. unclass	8,000 c. y.	$0.98	$1.60	$1.60
2. Struct. excav. unclass	150 c. y.	2.00	2.00	1.50
3. Special overhaul	10,000 sta. y.	.03	.02	.03
4. Special overhaul	1,000 c. y. m.	.20	.20	.50
5. Heavy base course, 1½ in.	17,000 ton	1.65	1.70	1.70
6. Watering	500 m. gal.	2.00	4.00	2.00
7. Operate roller	150 hr.	3.50	4.00	4.00
8. Furnish roller	1 ea.	50.00	75.00	100.00
9. Water plant	...... L. S.	50 00	50.00	100.00
10. M. c. l. cutback asphalt	22,000 gal.	.13	.16	.12
11. Heavy retread, grading C	5,600 ton	2.44	1.70	2.90
12. Retread seal cover	500 ton	4.25	5.00	4.00
13. Cutback asphalt, RC-3	64,000 gal.	.12	.16	.11
14. Concrete, cl. A	60 c. y.	30.00	30.00	25.00
15. Reinforcing steel	1,000 lb.	.06	.06	.10
16. Reinf. conc. culvert, 18 in.	44 l. f.	2.00	1.75	3.00
17. Reinf. conc. culvert, 24 in.	44 l. f.	2.75	2.00	4.00
18. Reinf. conc. culvert, 30 in.	4 l. f.	3.50	3.00	5.00
19. Reinf. conc. culvert, 36 in.	16 l. f.	4.25	3.50	7.00
20. Reinf. conc. culvert, 48 in.	8 l. f.	4.60	6.00	12.00
21. Move, reconstruct wood guardrail	636 l. f.	.85	.30	.60

FLORIDA HIGHWAYS

OWNER: State Road Dept. of Florida; J. H. Dowling, Engineer.

PROJECT: Construction of 5.675 miles of bituminous surfacing with shell base on Road 27A, Collier County; 5.445 miles of bituminous surfacing with rock base on Road 31, Marion County; 4.385 miles of bituminous concrete surface with rock base on Road 2, Osceola County; and one 451 ft. steel and timber bridge over Reedy Creek, on Road 2, Osceola County, Florida.

BIDS: Ten bids were received in December, 1937, on the Collier County project ranging from the contract low of $27,956 to $49,902; fourteen bids on the Marion County project ranging from the contract low of $50,100 to $76,252;

ten bids on the Osceola County project ranging from the contract low of $183,751 to $224,888; and eighteen bids on bridge project, Osceola County, ranging from contract low of $28.546 to $39,735. The following tabulation lists the totals and unit price bids for the four projects.

I — COLLIER COUNTY, 5.675 MILES

1. E. A. Pynchon, Ft. Lauderdale, Fla. (contract)	$27,956
2. Ebersbach Const. Co., Tampa, Fla.	27,993
3. M. J. Carroll Contracting Co., Orlando, Fla	29,742

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation	24,192 c. y.	$0.27	$0.35	$0.31
2. Tar prime mat'l., type 1	16,667 gal.	.15	.17	.152
3. Bit. surf. treatment	20,001 gal.	.125	.125	.12
4. Cover material, sand	561 c. y.	2.50	1.50	1.25
5. Shell base, salvaged mat.	66,669 s. y.	.20	.18	.24
6. Shell base, new mat	1,350 s. y.	1.25	1.00	.45

II — MARION COUNTY, 5.445 MILES

1. Langston Const. Co., Orlando, Fla. (contract)	$50,100
2. Manly Construction Co., Ocala, Fla	50,171
3. W. L. Cobb Const. Co., Tampa, Fla	54,842

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clear, grub	4.59 acre	$50.00	$75.00	$40.00
2. Excavation	4,984 c. y.	.30	.30	.25
3. Tar prime mat'l., type 1	14,057 gal.	.14	.14	.16
4. Cover mat'l., type 3	1,953 c. y.	4.25	5.00	5.00
5. Bit. surf. treatment	35,144 gal.	.10	.10	.095
6. Conc., Cl. A., headwalls	3.04 c. y.	30.00	30.00	30.00
7. Culvert, c. i. p., 16 in	21 l. f.	4.50	3.00	3.50
8. Relay cross drain pipe	41 l. f.	2.00	.40	1.00
9. Ocala rock base	14,116 ton	2.20	2.10	2.45
10. Rework rock base	65,398 s. y.	.05	.05	.05

III — OSCEOLA COUNTY, 4.385 MILES

1. Interstate Highway Const. Co., Ocala, Fla. (contract)	$183,751
2. Duval Eng. & Contr. Co., Jacksonville, Fla	187,362
3. John Mackler & Co., Tampa, Fla	1,187,802

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clear, grub	6.97 acre	$75.00	$75.00	$150.00
2. Excavation	35,683 c. y.	.30	.30	.38
3. Lateral ditch excav	137 c. y.	.50	.50	.80
4. Overhaul	34,674 sta. y	.01	.01	.01
5. Ocala rock base	12,384 s. y.	1.00	1.00	1.18
6. Tar prime mat'l., type 1	2,476 gal.	.25	.20	.22
7. Cov. mat'l., type 1	252 c. y.	6.00	6.50	7.50
8. Bit., surf. treatment	5,572 gal.	.10	.10	.14
9. Conc. pavement, plain	49,075 s. y.	2.35	2.46	2.30
10. Conc. pavement, reinf	7,606 s. y.	2.57	2.60	2.40
11. Conc. curb. gutter	240 l. f.	.75	1.00	1.20
12. Guard rail, Resiliflex	192 l. f.	1.15	1.20	1.10
13. Guard rail, Flexplate	192 l. f.	....	1.20	....
14. Guard rail, Empire	192 l. f.	....	1.20	....
15. Project markers, comp.	2 each	10.00	5.00	12.00
16. Sprigging	110,152 s. y.	.02	.02	.02
17. Culverts, conc. Cl. A	70.49 c. y.	25.00	30.00	35.00
18. Reinf. steel	5,024 lb.	.05	.06	.05
19. Treated timber	25.13 M.b.m.	125.00	150.00	110.00
20. Inlets, 0 to 4 ft. deep	12 each	110.00	100.00	80.00
21. Cor. met. pipe, 12 in	231 l. f.	1.25	1.00	1.50
22. Dynamite holes	1,072 each	.80	1.00	2.50
23. Dynamite	13,462 lb.	.35	.15	.20
24. Raw ground limestone	650 c. y.	5.00	6.50	6.00
25. Mix subgrade material	46,753 s. y.	.08	.05	.10
26. Relay conc. curb, gutter	430 l. f.	.50	.50	.75

IV. — STEEL BRIDGE, OSCEOLA COUNTY

1. Ryan Const. Co., Tampa, Fla. (contraot)	$28,546
2. C. T. Felix, St. Petersburg, Fla.	28,863
3. Coggin & Deermont, Chipley, Fla.	30,252

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Treated timber piles	4,500 l. f.	$1.30	$1.20	$1.30
2. Conc., cl. A., superstruct.	362.4 c. y.	23.00	25.00	25.00
3. Concrete handrail	903 l. f.	1.40	1.25	2.00
4. Reinf. steel	69,960 lb.	.05	.049	.05
5. Structural steel	165,900 lb.	.0475	.049	.049
6. Treated timber	7.45 M.b.m.	130.00	150.00	140.00
7. Remove old structures	l. s.	750.00	600.00	600.00

HIGHWAY SURFACING, CALIF.

OWNER: State Highway Commission, Sacramento, Calif.

PROJECT: Construction of 3.3 miles of grading and surfacing with plant mixed asphalt, medium curing type on crusher run base, between San Luis Obispo Creek and Cuesta siding in San Luis Obispo Co., Calif.

BIDS: Opened May 19, 1937 provided for alternative types of metal and reinforced concrete header, with the former indicating a 15 per cent lower cost on the basis of the low bid submitted.

CONDITIONS: Traffic is to be under direct control of the contractor, and it is estimated that such duty will add greatly to the cost due to the heavy grades on the temporary roads. Also there is included a divided roadway with a 4 ft. centre section protected by 33,350 ft. of temporary timber curb. Minimum hourly wage rates are stipulated of $1.00 for skilled and 60c for common labor.

LOW BIDDERS:

1. Metropolitan Construction Co. Los Angeles, Cal.	
Alternative A (metal headers)	$646,028
Alternative B (concrete headers)	651,255
2. George Pollock Co. Sacramento, Cal.	
Alternative A	666,634
Alternative B	671,532
3. Macco Construction Co. Clearwater, Cal.	
Alternative A	683,138
Alternative B	684,101

Item	Quan.	Unit Prices		
1. Clear, grub	170 sta.	$50.00	$50.00	$25.00
2. Water	8,400 M.g.	.75	1.00	1.25
3. Roadway excav. uncl	915,000 c. y.	.30	.245	.23
4. Struct. excav	16,200 c. y.	1.00	1.00	1.25
5. Ditch, channel excav	6,100 c. y.	.75	.70	.185
6. Overhaul, sta. yd	3,310,000 c. y.	.0025	.015	.008
7. Imported borrow	44,200 c. y.	.50	.60	.60
8. Trench excav	98,000 c. y.	.30	.30	.36
9. Rock fill	16,000 c. y.	2.35	1.50	2.10
10. Concrete demolition	4,400 c. y.	1.00	2.00	2.50
11. Scarify, level	38 sta.	15.00	10.00	12.00
12. Finish road	170 sta.	20.00	10.00	12.00
13. Crusher run base	22,500 ton	1.65	2.00	2.20
14. Mineral aggreg. surfacing	17,500 ton	1.90	2.60	3.05
15. Liquid asphalt, ROMC–4, 5.	915 ton	18.00	16.00	20.50
16. Liquid asphalt, SC–2, prime.	90 ton	10.00	10.00	13.35
17. Liquid asphalt, SC–4, surf.	27 ton	13.00	17.00	17.00
18. Liquid asphalt, SC–1A, pen.	7 ton	13.00	14.00	15.00
19. Liquid asphalt, SC–2, surface	455 ton	10.00	10.00	13.35
20. Mix, shape passages	37,500 s. y.	.08	.10	.10
21. Liquid asphalt seal	85 ton	18.00	21.00	20.50
22. Screenings, seal coat	1,050 ton	3.00	3.50	3.00
23. Conc. cl. A, struct	270 c. y.	22.00	30.00	42.50
24. Reinforcing steel	23,000 lb.	.06	.06	.10
25. Conc. cl. A, channel	65 c. y.	16.00	30.00	36.00
26. Mesh reinf., channel	380 s. y.	.50	.50	.50
27. C. M. pipe, 8 in	1,086 l. f.	.80	1.00	1.25
28. C. M. pipe, 18 in	3,146 l. f.	1.00	2.00	2.00
29. C. M. pipe, 24 in	1,644 l. f.	2.50	2.75	3.00
30. C. M. pipe, 30 in. 14 ga	206 l. f.	3.25	3.50	3.80
31. C. M. pipe, 30 in. 12 ga	250 l. f.	4.00	4.25	4.90
32. C. M. pipe, 36 in. 12 ga	530 l. f.	5.00	5.00	6.10
33. C. M. pipe, 36 in. 10 ga	1,412 l. f.	5.80	6.50	7.30
34. C. M. pipe, 42 in. 10 ga	92 l. f.	6.75	8.50	9.00
35. C. M. pipe, 60 in. 8 ga	204 l. f.	13.00	15.00	15.75
36. Underdrains, perf., 8 in	6,754 l. f.	.80	1.00	1.10
37. Underdrain rock fill	750 c. y.	3.00	1.50	3.05
38 Relay present pipe	330 l. f.	1.00	.75	1.25
39. Remove, salvage pipe	254 l. f.	1.00	.50	.60
40. C. M. pipe, 75 in. m.p. 410–18	390 l. f.	15.00	15.00	18.05
41. C. M. pipe, 75 in. m.p. 47–15	300 l. f.	20.00	20.00	20.00
42. C. M. pipe, 105 in. m.p	170 l. f.	20.00	25.00	25.00
43. C. M. pipe, 120 in. m.p	300 l. f.	40.00	45.00	49.00
44. Spillway assemblies	39 ea.	12.00	14.00	17.00
45. Drop inlet frames, covers	32 ea.	40.00	50.00	57.00
46. Redwood timber inlet covers	30 ea.	10.00	5.00	12.00
47. Laminated guard railings	14,535 l. f.	.90	.90	1.25
48. Culvert markers	55 ea.	2.50	4.00	3.00
49. Property fences	6.8 mi.	700.00	650.00	700.00
50. Drive gates	10 ea.	20.00	20.00	15.00
51. Timber curb	35,550 l. f.	.30	.30	.35
52. Monuments	75 ea.	3.00	4.00	3.00

ALTERNATIVE A.

Item	Quan.	Unit Prices		
1. Metal headers, 6x6 in.x4 ft.	271 ea.	4.10	5.00	4.70
2. Metal headers, 6x6 in.x 6 ft.	1,467 ea.	5.10	6.00	5.90
3. Metal headers, 6x6 in.x 8 ft.	218 ea.	6.10	7.25	7.00
4. Metal S.B. headers, 6x6 in. x 8 ft.	69 ea.	6.25	7.50	7.20
5. Metal stretcher, 6x8 in.x 6 ft.	4,169 ea.	4.35	5.25	4.60
6. Metal header caps	1,682 ea.	.15	.30	.25
7. Metal header spacers	218 ea.	1.00	1.25	1.15
8. Metal header inserts	287 ea.	.60	.90	.65
9. Gap fillers	4 ea.	25.00	30.00	40.00
10. Stretcher inserts	301 ea.	.70	.75	.90

ALTERNATIVE B.

Item	Quan.	Unit Prices		
1. Reinf. conc. headers, 5x6 in.x 6 ft.	544 ea.	3.80	5.00	3.64
2. Reinf. conc. headers, 5x10 in.x 6 ft.	2,357 ea.	5.25	6.00	5.02
3. Reinf. conc. stretchers, 6x6 in.x 6 ft.	2,204 ea.	3.25	4.00	3.18
4. Reinf. conc. stretchers, 6x8 in.x 6 ft.	2,126 ea.	3.80	4.25	3.66
5. Reinf. conc. stretchers, 6x10 in.x 6 ft.	1,082 ea.	4.60	5.25	4.40
6. Conc. filler blocks, 10x6x10 in.	18 ea.	.50	1.50	1.00

UNIT BID PRICES—HIGHWAYS

HIGHWAY SURFACING, ARIZONA

OWNER: U.S. Bureau Public Roads; C. H. Sweetser, district engineer.

PROJECT: Bitumen coating 13.264 mi. of 22 ft. roadway in Kaibab National Forest, Coconino Co., Arizona.

BIDS: Three bids were opened June 8, 1937 ranging from a low of $28,822 to a high of $41,469.

CONDITIONS: Minimum hourly wage rates are stipulated of $1.00 for skilled and 50 c. for common labor, with all asphalt materials required in the construction to be furnished by the government.

LOW BIDDERS:

1. Arizona Sand & Rock Co. Phoenix, Ariz.	$28,822
2. Skousen Bros. Albuquerque, N. M.	40,089
3. Tiffany Const. Co., Phoenix, Ariz.	41,469

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation, uncl.	100 c. y.	$0.95	$2.00	$0.80
2. Borrow excav. uncl.	2,000 c. y.	.38	.75	.70
3. Overhaul	180,000 st. y.	.004	.003	.015
4. Road reconditioning	13.248 mi.	410.00	300.00	300.00
5. Watering	900 M.g.	2.10	4.00	2.25
6. Water plant (lump sum)		950.00	2,700.00	300.00
7. Apply prime asphalt, MC-2	365 ton	10.00	13.00	18.00
8. Apply asphalt, RC-4, cl. A. pav't	250 ton	10.50	17.00	20.00
9. Cover cl. A pav't. split method.	2,800 c. y.	4.00	6.10	6.40
10. Misc. clearing (force acct.)		1,500.00	1,500.00	1,500.00

LOUISIANA HIGHWAYS

OWNER: State Highway Commission, Baton Rouge, La.; Harry B. Henderlite, Engineer.

PROJECT: Construction of 5.28 miles of grading and surfacing on Route 84, Franklin Parish; 10.47 miles on Caddo Lake–Shreveport Highway, Caddo Parish; and 2.47 miles on Frisco and Elvina Roads, St. John Parish.

BIDS: Eight bids were received on Franklin Parish project in January, 1938, ranging from $27,695 to $34,043; eleven bids on the Caddo Parish project ranging from $184,908 to $228,340; and five bids on the St. John Parish project ranging from $9,135 to $11,821. Bids were based on minimum hourly wage rates of 75c. for skilled and 30c. for common.

I — FRANKLIN PARISH — GRADING 5.28 MILES

1. Robinson & Wilds, Wildsville, La. (contract)	$27,695
2. Robinson & Young, Baton Rouge, La	28,815
3. T. W. Kleinpeter, Baton Rouge, La	28,950

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Drainage excav	1,600 c. y.	$0.25	$0.20	$0.23
2. Roadway excav., binder	27,782 c. y.	.18	.19	.23
3. Overhaul	10,000 sta. y.	.005	.01	.001
4. Rebuilt fence	103.5 sta.	1.50	2.50	2.00
5. New fence posts	1,000 ea.	.25	.25	.10
6. Comb. mesh wire fence	2.4 sta.	10.00	15.00	10.00
7. Right-of-way markers	71 ea.	1.50	2.00	2.00
8. Plank gates	6 ea.	8.00	10.00	8.00
9. Washed gravel	4,503 c. y.	2.35	2.65	2.45
10. C. m. pipe, 18 in.	408 l. f.	2.40	2.25	2.20
11. C. m. pipe, 24 in.	432 l. f.	3.70	3.50	3.50
12. C. m. pipe, 30 in.	252 l. f.	4.50	4.50	4.35
13. C. m. pipe, 36 in.	364 l. f.	7.10	7.00	7.10
14. Relay culvert pipe	12 l. f.	1.00	1.00	2.00
15. Untreated timber	3 M.b.m.	100.00	100.00	100.00
16. Creo. timber	21.4 M.b.m.	100.00	95.00	100.00
17. Creo. timber piles	1,220 l. f.	1.00	.85	.95
18. Unload test piles	2 ea.	75.00	50.00	75.00
19. Remove old bridge	1 ea.	10.00	25.00	10.00
20. Move trees	14 ea.	1.50	2.00	3.00
21. Warning signs	2 ea.	20.00	25.00	30.00
22. Relocate structures	L. s.	889.00	740.00	653.00

II — CADDO PARISH — GRADING 10.47 MILES

1. Robinson & Young, Louisville, Ky. (contract)	$184,908
2. Flenniken Const. Co., Shreveport, La	185,941
3. Reynolds & Sutton, Ruston, La	189,552

Item	Quan.	Unit Prices (1)	(2)	
1. Clearing	130 acre	$40.00	$40.00	$45.00
2. Grubbing	100 acre	35.00	50.00	50.00
3. Drainage excav	20,000 c. y.	.20	.20	.17
4. Roadway excav	543,923 c. y.	.17	.18	.17
5. Overhaul	586,678 sta. y.	.005	.001	.00
6. Rebuilt fence	36.98 sta.	2.00	1.50	2.50
7. New fence posts	300 ea.	.25	.15	.20
8. New barbed wire fence	555.7 sta.	4.75	5.00	5.00
9. Mesh and wire fence	37.65 sta.	10.00	6.00	8.00
10. Project markers	2 ea.	25.00	5.00	15.00
11. Right-of-way markers	180 ea.	2.00	1.50	2.00
12. Plank gates	80 ea.	10.00	7.50	10.00
13. Concrete pipe, 18 in.	498 l. f.	2.40	2.00	2.40
14. Concrete pipe, 24 in.	1,449 l. f.	3.40	3.00	3.40
15. Concrete, cl. A	2,254 c. y.	18.00	17.00	19.60
16. Reinf. steel	273,428 lb.	.045	.035	.047
17. Strip sodding	390,000 s. y.	.025	.03	.02
18. Slab sodding	18,000 s. y.	.15	.20	.18
19. Grouted riprap	100 s. y.	2.50	1.00	2.50
20. Fruit trees, replanted	12 ea.	1.00	1.00	5.00
21. Plant trees	450 ea.	.25	.50	.50
22. Relocate 9 structures	L. s.	600.00	385.00	415.00

III — ST. JOHN'S PARISH — GRADING, SURFACING 2.47 MILES

1. R. B. Tyler Co., Baton Rouge, La. (contract) (clamshell surface)	$9,135
2. Le Blanc Bros., Baton Rouge, La. (clamshell surface)	9,566
3. N. Cardinal & Co., Baton Rouge, La. (washed gravel surface)	9,806

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Drainage excav	750 c. y.	$0.30	$0.25	$0.28
2. Roadway excav	7,066 c. y.	.25	.21	.28
3. Overhaul	5,000 sta. y.	.01	......	.01
4. Rebuilt fence	10 sta.	3.00	2.00	2.50
5. New barbed wire fence	10 sta.	6.00	5.50	6.00
6. New fence posts	100 ea.	.25	.25	.20
7. Mesh and wire fence	10 sta.	10.00	10.00	9.00
8. Right-of-way markers	36 ea.	2.00	2.00	1.50
9. Plank gates	6 ea.	10.00	11.00	10.00
10. Clamshell surface	2,237 c. y.	2.37	2.60	......
11. Washed gravel surface	2,065 c. y.	......	......	2.50
12. Corr. galv. metal pipe, 24 in.	160 l. f.	3.50	3.70	3.65
13. Corr. galv. metal pipe, 30 in.	80 l. f.	4.50	4.50	4.55
14. Relay culvert pipe	48.5 l. f.	1.00	1.00	1.00
15. Untreated timber	0.46 M.b.m.	100.00	90.00	100.00
16. Creosoted timber	0.98 M.b.m.	100.00	100.00	100.00
18. Croe. plank RR. cross	563 s. f.	.40	1.00	1.50
19. Relocate buildings	l. s.	200.00	124.00	110.00

NEW MEXICO HIGHWAYS

OWNER: U. S. Dept. Agriculture; J. A. Elliott, engineer, Denver, Colo.

PROJECT: Grading, surfacing and drainage of 3.278 mi. of 22 ft. highway of the Carrizozo-Roswell Forest system in Lincoln National Forest, N. M.

BIDS: Six bids were opened May 1937, and contract awarded June 1937. The proposals ranged from the contract low of $63,116 to a high of $79,694.

LOW BIDS:

1. Skousen Bros., Albuquerque, N. M. (contract)	$63,116
2. Lee Moor Contracting Co., El Paso, Texas	70,132
3. Dudley Stone Products Co., El Paso, Texas	70,832

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excav. unclass	68,000 c. y.	$0.22	$0.27	$0.30
2. Excav. struct. unclass	2,270 c. y.	.75	1.00	.80
3. Excav. borrow. unclass	1 2,000 c. y.	.20	.27	.20
4. Special overhaul	135,000 sta. y.	.02	.005	.025
5. Special overhaul	2,500 c. y. m.	.20	.30	.10
6. Gravel base, heavy, 3 in.	8,000 ton	.65	.55	.60
7. Crusher-run top course	4,000 ton	.75	.63	.80
8. Supplemental gravel	200 ton	.70	.63	.80
9. Watering	500 m. gal.	.75	1.00	2.00
10. Operate roller	15 day	20.00	20.00	16.00
11. Furnish roller	1 ea.	50.00	100.00	500.00
12. Furnish water plant	l. s.	50.00	800.00	100.00
13. Conc. Cl. "A"	608 c. y.	17.50	19.25	18.50
14. Conc. Cl. "B"	36 c. y.	17.50	17.00	18.50
15. Conc. Cl. "D"	87 c. y.	20.00	22.00	18.50
16. Reinf. steel	68,900 lb.	.048	.05	.055
17. Struct. steel	77,200 lb.	.064	.067	.06
18. Cement, Cl."A", masonry	110 c. y.	15.00	18.00	15.00
19. Corr. metal pipe, 24 in.	350 l. f.	2.90	3.25	2.75
20. Corr. metal pipe, 30 in.	376 l. f.	3.75	3.90	3.55
21. Corr. metal pipe, 36 in.	340 l. f.	5.50	6.20	5.35
22. Pile treated timber	1,620 l. f.	1.00	1.60	1.50
23. Test pile	2 ea.	100.00	100.00	45.00
24. Loose rip-rap	150 c. y.	2.50	6.00	2.00
25. Barbed wire fence	34,000 l. f.	.06	.07	.05
26. Gates, 12 ft	30 ea.	10.00	16.00	12.00

UNIT BID PRICES—HIGHWAYS

MISSISSIPPI HIGHWAYS

OWNER: U. S. Bureau Public Roads; H. J. Spelman, engineer.

PROJECT: Construction of 2.566 miles of grading, drainage, reinforced concrete and bituminous surface pavement in the Vicksburg National Military Park, Mississippi.

BIDS: Four bids were opened in December, 1937, ranging from the contract low of $167,486 to $189,505. Project consists largely of beautification work, with considerable sodding, rustic type guard rail, and memorial monument relocation.

LOW BIDDERS:

1. Barber Bros. Const. Co., Baton Rouge, La. (contract)	$167,486
2. Carey-Reed Co., Lexington, Ky.	168,371
3. Cobb Bros. Const. Co. Inc., Meridian, Miss.	175.700

		Unit Prices		
Item	Quan.	(1)	(2)	(3)
1. Clearing	19 acre	$80.00	$125.00	$75.00
2. Grubbing	19 acre	200.00	125.00	75.00
3. Excav., unclass	49,000 c. y.	.45	.50	.50
4. Struct. excav., unclass	4,000 c. y.	.75	1.00	1.00
5. Borrow excav., unclass	6,000 c. y.	.55	.75	.40
6. Overhaul	135,000 st. y.	.02	.01	.02
7. Special overhaul, mile-yd.	4,500 m. y.	.12	.15	.40
8. Remove old roads, 1,000 s. f. units	35 ea.	8.00	5.00	75.00
9. Reconstruct base course	5,200 s. y.	.20	.15	.50
10. Base course material	600 c. y.	3.00	2.25	3.00
11. Refining tar for prime coat	2,300 gal.	.28	.20	.35
12. Cover, cl. A pave., grading B	80 ton	4.50	3.50	4.00
13. Tar, cl. A pavement	1,800 gal.	.28	.22	.35
14. Reinf. conc. pavement, 5–7½ in	31,000 s. y.	2.25	2.35	2.25
15. Concrete, cl. A	65 c. y.	45.00	30.00	40.00
16. Reinf. steel	350 lb.	.10	.10	.10
17. Brick masonry	35 c. y.	38.50	30.00	75.00
18. Reinf. conc. pipe, 15 in.	1,000 l. f.	1.85	1.50	2.00
19. Reinf. conc. pipe, 18 in.	500 l. f.	2.25	2.00	2.50
20. Corr. galv. metal pipe, 15 in	4,500 l f.	1.50	1.25	2.00
21. Corr. galv. metal pipe, 18 in	1,100 l. f.	1.80	1.75	2.50
22. Drop inlets	34 ea.	30.00	40.00	50.00
23. Catch basins	14 ea.	30.00	40.00	75.00
24. Reinf. conc. c. b. covers	34 ea.	6.00	10.00	25.00
25. C. I. frame and grating	34 ea.	33.00	25.00	35.00
26. Junction boxes	10 ea.	25.00	25.00	40.00
27. Reinf. conc. covers	10 ea.	6.00	10.00	20.00
28. Concrete curb, 8x18 in.	20 l. f.	2.00	1.00	1.00
29. Conc. headers, lip aprons.	330 l. f.	.80	.50	1.00
30. Rustic guard fence, hub high	9,500 l. f.	1.40	1.25	1.00
31. Cut, lift, place sod, furnish	612,000 s. f.	.035	.035	.035
32. Remove, reset monument.	10 ea.	150.00	150.00	125.00
33. Remove, reset markers	30 ea.	6.00	20.00	10.00
34. Conc. base, brick walk	90 s. y.	1.50	1.00	2.00
35. Brick walk	90 s. y.	3.00	1.00	3.00

INDIANA STATE HIGHWAYS

OWNER: State Highway Department; M. R. Keefe, Engineer.

PROJECT: Construction of 0.382 miles concrete pavement in Gibson Co.; 3.811 miles concrete pavement in Tippecanoe Co.; and 3.647 miles grading and concrete structures in Martin Co.

BIDS: Opened June 8, 1937, with all materials required for the construction furnished by the contractors, and minimum hourly wage rates stipulated of 60c. for skilled and 45c. for common labor.

LOW BIDDERS:

I. Gibson County—0.382 miles concrete paving.

1. Pioneer Contracting Co., Evansville, Ind.	$21,703
2. Foulkes Contracting Co., Terre Haute, Ind.	22,970
3. Flaud M. Lloyd, Sullivan, Ind.	24,896

II. Tippecanoe County—3.811 miles concrete paving.

1. Roger Daoust, Defiance, Ohio	146,805
2. Wm. D. Vogel, Indianapolis, Ind.	153,571
3. Pioneer Contracting Co., Evansville, Ind.	154,224

III. Martin County—3.647 miles grading and structures.

1. Highland Co., Inc., Louisville, Ind.	54.874
2. U. R. Price & Co., Bloomington, Ind.	57,130
3. General Dredging Co., Ft. Wayne, Ind.	59,756

I—GIBSON COUNTY PROJECT

		Unit Prices		
Item	Quan.	(1)	(2)	(3)
1. Excavation	3,157 c. y.	$0.45	$0.50	$0.50
2. Excav. special borrow	836 c. y.	.50	.50	.60
3. Conc., strs. special Cl. D.	100.5 c. y.	35.00	30.00	25.00
4. Conc., strs. Cl. D	1.8 c. y.	35.00	30.00	25.00
5. Reinf. steel, strs	6,855 lb.	.06	.05	.05
6. Struct. removal, culvt. extens.	2 each	100.00	125.00	50.00
7. Finish shoulders, ditches	2,129 l. f.	.15	.15	.20
8. Guard rail removal	196 l. f.	.10	.20	.50
9. Maintain traffic	L.S.	750.00	1,800.00	3,400.00
10. Remove pavt	4,080 s. y.	.25	.40	.40
11. CM pipe, 12 in	32 l. f.	1.40	1.00	1.50
12. CM pipe, 15 in	106 l. f.	1.60	1.50	2.00
13. Sewer pipe misc., 6 in., b. c.	50 l. f.	.50	1.20	.70
14. C.M. pipe, perf., 6 in., b. c.	50 l. f.	.75	1.20	.70
15. Perf. misc. drains, 6 in.	50 l. f.	.45	1.00	.60
16. Agg., subsurf. drains	10 l. f.	3.50	2.50	3.00
17. Reinf. conc. pavt	3,828 s. y.	2.50	2.50	2.60
18. Reinf. conc. pavt. spec	1,091 s. y.	2.75	2.65	2.80
19. Expansion joint	1,040 l. f.	.60	.60	.80
20. Perf. C.M. pipe, 6 in	50 l. f.	.70	1.00	.60

II—TIPPECANOE COUNTY PROJECT

		Unit Prices		
Item	Quan.	(1)	(2)	(3)
1. Excavation	18,730 c. y.	$.32	$.40	$.40
2. Excav. spec. borrow	3,305 c. y.	.35	.50	.50
3. Spec. fill material	50 c. y.	1.50	2.00	.75
4. Finish shoulders, ditches	22,184 l. f.	.12	.15	.15
5. Conc. strs., Cl. D	6.0 c. y.	25.00	30.00	20.00
6. Conc. strs., spec. Cl. D	134.9 c. y.	23.00	25.00	25.00
7. Reinforce steel, structs	16,314 lb.	.04	.05	.06
8. Conc. catch basin	1 each	100.00	120.00	125.00
9. Spec. conc. catch basin	6 each	40.00	90.00	125.00
10. Spl. conc. inlet, Type A	12 each	70.00	65.00	60.00
11. Spl. conc. inlet, Type B	20 each	100.00	95.00	100.00
12. V. C. pipe inlets, 12 in	2 each	25.00	25.00	30.00
13. Remove culvert extensions	2 each	75.00	50.00	50.00
14. Sodding, fertilized	3,379 s. y.	.25	.18	.26
15. Dress, sod, fertilized	3,577 s. y.	.30	.22	.31
16. Seeding, fertilized	3.4 acre	40.00	75.00	20.00
17. Side ditch, paved	250 l. f.	1.00	1.10	1.20
18. Lip curb, Type A	3,436 l. f.	1.30	1.05	1.25
19. Lip curb, Type B	3,811 l. f.	1.20	1.05	1.25
20. Lip curb, Type C	1,220 l. f.	1.00	1.20	1.15
21. Curb removal	36 l. f.	.40	.20	1.00
22. Pavt. removal	3,935 s. y.	.40	.35	.27
23. Flex. steel guard rail	10,754 l. f.	.85	.85	.90
24. Flex. steel g.r. reset	1,172 l. f.	.50	.40	.60
25. Top soil	600 c. y.	1.00	.60	1.20
26. Gravel surf., Cl. C	237 c. y.	2.10	3.00	1.75
27. Sewer pipe misc., b.c. 6 in.	360 l. f.	.50	.50	.35
28. Perf. c.m. pipe, b.c. 6 in.	194 l. f.	.90	1.00	.75
29. Perf. c.m. sewer pipe, 6 in.	640 l. f.	.50	.50	.27
30. Perf. c.m. pipe, 6 in	150 l. f.	.90	.90	.70
31. Pipe, c.m., 12 in	690 l. f.	1.10	1.35	1.40
32. Pipe, c.m., 15 in	36 l. f.	1.40	1.60	1.85
33. Pipe, c.m., 24 in	240 l. f.	2.50	2.60	2.70
34. Pipe, r.c., v.c., c.i., 12 in	420 l. f.	1.15	1.25	1.40
35. Pipe, r.c., v.c., c.i., 15 in	174 l. f.	1.40	1.50	1.85
36. Pipe, r.c., v.c., c.i., 18 in	708 l. f.	2.00	1.90	2.50
37. Pipe, r.c., v.c., c.i., 24 in	14 l. f.	2.50	3.00	3.00
38. Pipe, r.c., v.c., 12 in	120 l. f.	1.15	1.25	1.40
39. Pipe, v.c., sewer, 18 in	60 l. f.	1.50	1.65	2.50
40. Pipe, r.c., 15 in	24 l. f.	1.40	1.50	1.80
41. Relay c.m. pipe, 12 in	16 l. f.	.70	1.25	2.00
42. Agg., sub-surf. drains	265 c.y.	2.10	2.50	3.50
43. Reinf. conc. pavt	54,200 s. y.	1.71	1.80	1.75
44. Reinf. steel, pavt	5,213 lb.	.04	.05	.06
45. Expansion joints	10,362 l. f.	.48	.50	.50
46. Expansion joints, type D	1,496 l. f.	.75	.70	.60
47. Expans. joints, cork, 1 in	590 l. f.	.50	.50	.70
48. Expans. joints, bit., 2 in	114 l. f.	.25	.20	.30
49. Anchor bolts	120 each	1.00	1.00	.75

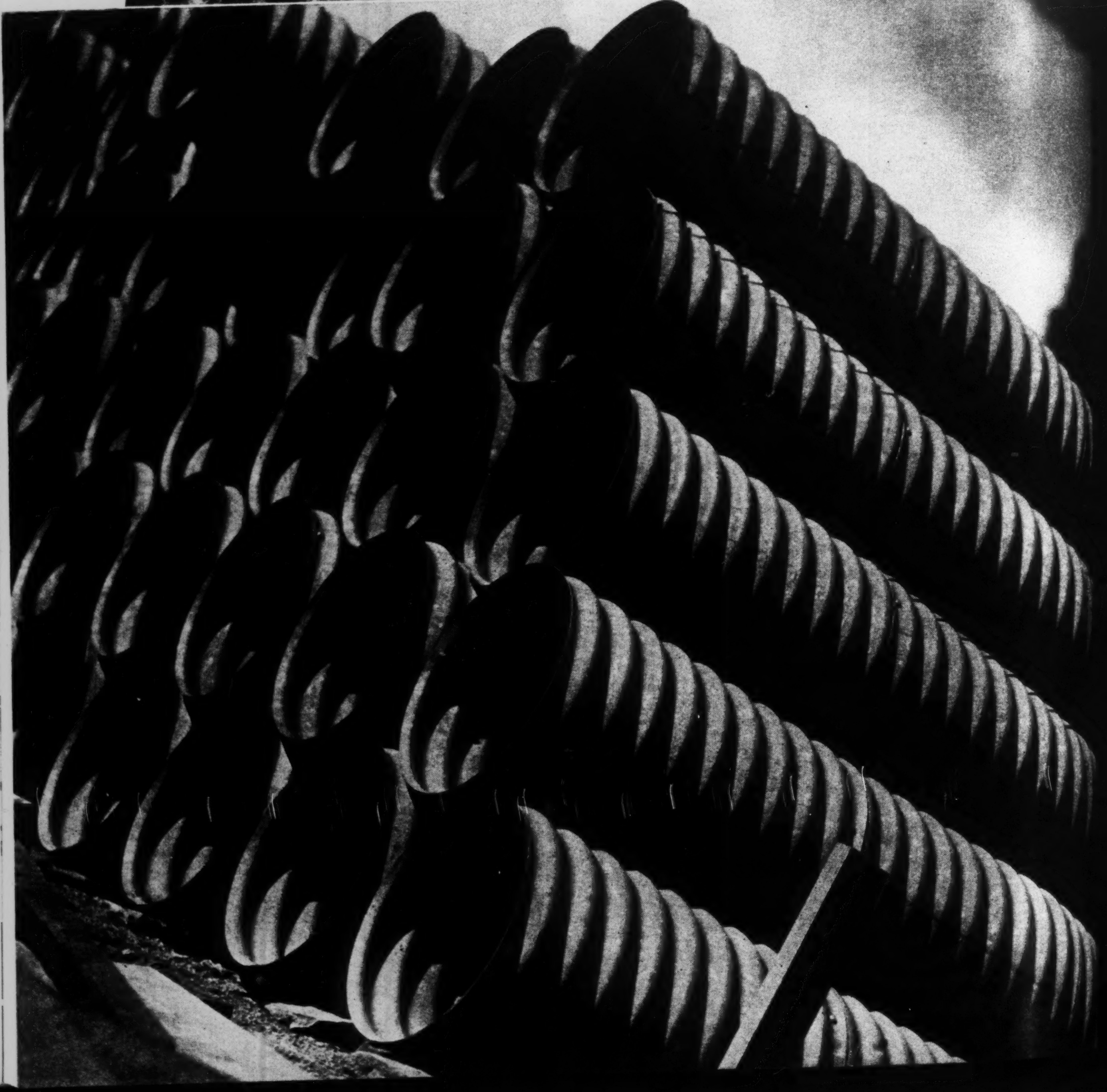
III—MARTIN COUNTY PROJECT

		Unit Prices		
Item	Quan.	(1)	(2)	(3)
1. Excavation	75,447 c. y.	$0.28	$0.29	$0.32
2. Excav. spec. borrow	8,036 c. y.	.28	.29	.33
3. Excav. solid rock	13,000 c. y.	.75	1.00	.90
4. Overhaul, one balance	1,059 c. y.	.05	.10	.05
5. Paved side ditch	2,425 l. f.	.90	.80	.85
6. Monument, type C	1 each	10.00	7.00	10.00
7. Pipe, 12 in	32 l. f.	1.20	1.10	1.05
8. Pipe, 15 in	170 l. f.	1.50	1.35	1.30
9. Pipe, 18 in	208 l. f.	1.75	1.50	1.65
10. Pipe, 24 in	210 l. f.	2.50	2.35	2.10
11. C.M. pipe, 84 in	52 l. f.	16.50	13.50	15.50
12. Pipe, r.c., c.i., c.m., 30 in	48 l. f.	3.25	2.80	3.00
13. Pipe, r.c., c.i., c.m., 36 in	216 l. f.	4.25	4.30	4.30
14. Pipe, r.c., c.i., c.m., 42 in	118 l. f.	5.00	5.20	5.25
15. Pipe, r.c., c.i., c.m., 48 in	210 l. f.	7.00	7.25	7.50
16. Sewer pipe, misc. b.c., 6 in	250 l. f.	.70	.65	.75
17. Perf. c.m. pipe, b.c., 6 in	110 l. f.	1.05	.90	.75
18. Sewer pipe, misc., 6 in	250 l. f.	.70	.60	.50
19. Perf. c.m. pipe, 6 in	110 l. f.	1.00	.85	.70
20. Agg. sub-surf. drains	36 c. y.	2.50	2.80	2.50
21. Rip rap	211 s. y.	2.50	1.60	2.00
22. Conc. struct. special Cl. D.	6.6 c. y.	23.00	25.00	22.00
23. Conc. struct. Cl. D	510.1 c. y.	22.00	20.00	22.00
24. Reinf. struct steel	35,235 lb.	.05	.045	.0475

CLOSED

. . . because

SLOW
Men Working Ahead



FOR REPAIRS!

Culverts were not Installed!

Adequate drainage with U·S·S Copper Steel Culverts prevents costly road maintenance

NO one ever heard of a road with too many culverts—but who hasn't been held up, bogged down or detoured by the road with too few? Poor drainage causes four out of five road failures. Sunken pavements, slides, wash-outs, cracks, chuck holes and frost heaves—all can be blamed on water in the wrong place.

You can prevent much of this expensive maintenance by adequate use of culverts. And, since metal culverts cost less to buy and install, you can afford more of them. U·S·S Copper Steel Culverts save on first cost and freight costs. They can be installed quicker with less labor and require no construction of forms.

Other important features of U·S·S Copper Steel Culverts are their strength, endurance, resistance to fatigue and ability to withstand sub-soil changes.

The cost of small bridges, too, can be drastically reduced by the use of U·S·S Sectional Plates. After the foundation is laid, a few workmen can quickly bolt together a perfect arch on which to build the rest of the bridge. This saves time, labor, materials and a considerable amount of engineering work.

Our new culvert book describes the various kinds of culvert materials and how they should be applied. Write for a copy.

BEAUTY AND STRENGTH AT LOW COST. This small bridge built with an arch of U·S·S Sectional Plates forms an economical type of structure that can be quickly installed over small streams. It eliminates expensive form work and saves on labor and engineering costs.

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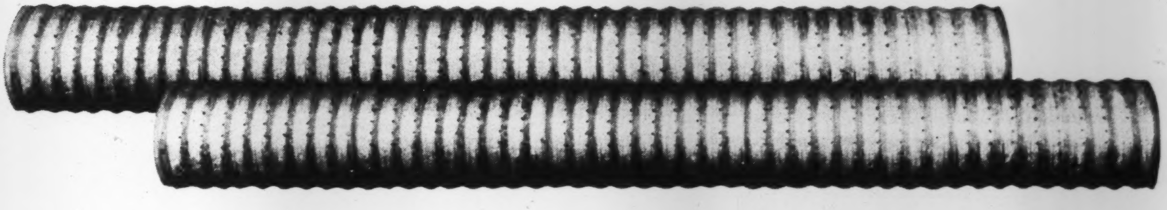
PERFORATED CULVERTS of U·S·S Copper Steel drain water out of wet sub-grades, preventing breaks, holes and sunken pavements.



U·S·S GALVANIZED COPPER STEEL SHEETS

CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

UNIT BID PRICES—HIGHWAYS

PAVING, WEEHAWKEN, N. J.

OWNER: City of Weehawken, N. J.; Frank Radigan, Engineer.

PROJECT: Construction of 1½ miles of 40-ft. roadway with two 5-ft. sidewalks, comprised of 5-in. granite block on 8-in concrete base, on Hackensack Plank Rd. from Gregory Ave. to 18th St.; 19th St. from Park Ave. to the Plank Rd.; and from Gregory Ave. to Hackensack Plank Rd. along Shippen St., all in Weehawken.

BIDS: Eight bids were opened in January, 1938, ranging from $384,566 to $434,555, with completion scheduled for 120 days after contract award and all materials, labor and equipment to be furnished by the builder. Heavy retaining walls are necessary due to height of road above adjoining terrain.

LOW BIDDERS:

1. Clinton Asphalt Co., Union City, N. J.	$384,566
2. Curtin Bros. Inc., Little Ferry, N. J.	397,605
3. J. B. Burns, Dumont, N. J.	399,559

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clear site	l. s.	$2,400.00	$2,000.00	$1,500.00
2. Roadway excav., uncl	21,170 c. y.	3.00	4.50	.75
3. Foundation excav	9,000 c. y.	4.10	4.75	3.00
4. Rock excav., struct	1,500 c. y.	8.00	10.00	4.00
5. Earth excav., struct	1,500 c. y.	2.50	1.25	2.00
6. Sub-base	1,000 c. y.	1.25	1.00	2.00
7. Concrete sidewalk	20,650 s. f.	.30	.26	.25
8. Concrete base	9,725 s. y.	1.98	2.00	2.85
9. Stone block pavement	9,725 s. y.	5.65	6.00	6.50
10. Concrete pavement, cl. B	7,475 s. y.	3.50	3.75	3.90
11. Reset stone block	250 s. y.	2.00	2.25	3.00
12. Concrete curb, white	7,750 l. f.	1.50	1.50	1.25
13. Reset curb, bluestone	150 l. f.	1.50	.79	1.00
14. Curb, concrete	10 c. y.	10.00	9.00	10.00
15. Catch basins	40 ea.	100.00	100.00	100.00
16. Manholes	14 ea.	100.00	100.00	75.00
17. Manholes, rebuilt	14 ea.	75.00	65.00	50.00
18. Reset catch basins, inlets	20 ea.	10.00	20.00	20.00
19. Reinf. conc. drains, 18-in	2,600 l. f.	2.00	1.80	1.50
20. Reinf. conc. drains, 12-in	1,100 l. f.	1.75	1.65	1.10
21. Concrete, structural	8,100 c. y.	19.00	17.00	24.70
22. Guard rail, wire rope	2,200 l. f.	1.25	1.25	.75
23. Monuments	10 ea.	10.00	22.50	10.00
24. Manhole heads	14 ea.	30.00	25.00	30.00
25. Remove catch basins	12 ea.	50.00	17.00	20.00
26. Reinf. steel	5 ton	120.00	150.00	120.00
27. Cyclone fence, 4 ft	350 l. f.	1.60	1.60	1.75
28. Sheet asphalt, top	2 ton	11.00	25.00	12.00
29. Sheet asphalt, binder	2 ton	10.00	25.00	12.00

NORTH CAROLINA HIGHWAYS

OWNER: North Carolina Dept. Highways and Public Works Commission, Raleigh, N. C.

PROJECT: Construction of several highway projects including grading, surfacing and structures, bids taken Dec. 21, 1937. The following tabulations present totals and unit prices of eight of the contracts which total 40 per cent of the aggregate awards. The contractors are required to furnish all materials, labor and equipment for the completed construction. Minimum hourly wage rates are stipulated at 55c. for skilled and 25c. for common labor.

I — BITUMINOUS CONCRETE SURFACING AND STRUCTURES

U. S. 17; 2.05 miles, Williamson to Windsor, Bertie County, W. T. Daughtry, Engineer

1. F. D. Cline, Raleigh, N. C. (contract)	$42,835
2. Brown Paving Co., Lexington, N. C	44,766
3. Atlantic Bitulithic Co., Windsor-Salem, N. C	57,691

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clearing	2 acre	$100.00	$100.00	$75.00
2. Grubbing	2 acre	50.00	100.00	75.00
3. Drain ditches	1,000 c. y.	.60	.50	.50
4. Unclass. excav	2,600 c. y.	.60	.50	.60
5. Borrow excav	2,000 c. y.	.60	.50	.50
6. Sheet asphalt, SC	1,170 ton	7.35	8.25	.....
7. Sheet asphalt, BC	1,500 ton	7.75	8.25	.....
8. Warcolite, type J	1,170 ton	....	....	12.25
9. Warcolite, type I	1,500 ton	....	....	12.25
10. Concrete base, 7 in	4,670 s. y.	2.35	2.45	2.75
11. Concrete base, 6 in	2,850 s. y.	2.30	2.35	2.60
12. R. C. pipe, 18 in	12 l. f.	2.00	3.00	2.50
13. R. C. pipe, 24 in	10 l. f.	3.00	4.00	3.5[illegible]
14. R. C. pipe, 30 in	33 l. f.	6.00	7.00	5.0[illegible]
15. R. C. pipe, 15 in	45 l. f.	1.50	2.00	2.[illegible]
16. R. C. pipe, 18 in	27 l. f.	3.00	2.50	2.[illegible]
17. R. C. pipe, 24 in	30 l. f.	5.00	4.00	3.[illegible]
18. R. C. pipe, 30 in	48 l. f.	7.00	7.00	4.[illegible]
19. Concrete C. B's	2 c. y.	75.00	50.00	50.[illegible]
20. Concrete H. W	9 c. y.	25.00	20.00	25.[illegible]
21. Concrete, cl. A	4 c. y.	30.00	40.00	30.[illegible]
22. Reinf. steel	390 lb.	.10	.10	[illegible]

II — SAND ASPHALT SURFACING AND STRUCTURES

County road, 1.36 miles, Currituck — Camden Counties, E. P. Koonce, Engineer; five bids ranging to $62,178.00

1. Blythe Bros. Co., Charlotte, N. C. (contract)	$48,8[illegible]
2. Nello L. Teer, Durham, N. C	53,56[illegible]
3. E. W. Grannis, Fayetteville, N. C	58,1[illegible]

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clearing	2 acre	$100.00	$100.00	$100.00
2. Grubbing	1 acre	25.00	100.00	100.00
3. Drainage ditches	1,000 c. y.	.30	.60	.35
4. Unclass. excav	7,600 c. y.	.24	.28	.35
5. Borrow excav	82,400 c. y.	.24	.28	.30
6. Overhaul	300,000 sta. y.	.005	.005	.005
7. Sand asphalt surface	14,930 s. y.	.90	.85	1.00
8. R. C. pipe, 18 in	120 l. f.	1.75	2.00	2.00
9. R. C. pipe, 24 in	46 l. f.	2.75	3.50	3.00
10. Asp. coated c. m. pipe, 36 in	50 l. f.	7.00	.....	.....
11. Bit. coated c. m. pipe, 36 in	50 l. f.	.....	10.00	7.00
12. Concrete headwalls	2 c. y	20.00	25.00	25.00
13. Reset fence	3,000 l. f.	.04	.03	.03
14. Dynamite	18,000 lb.	.20	.20	.30
15. Concrete, cl. A	55 c. y.	26.00	30.00	30.00
16. Reinf. steel	13,160 lb.	.055	.06	.05
17. Creo. timber piles	1,680 l. f.	1.50	1.65	1.35
18. Creo. timber sheetpiling	7.8 M.b.m.	144.00	150.00	150.00
19. Structural steel	17,400 lb.	.06	.10	.063
20. Creo. struct. timber	3.5 M.b.m.	140.00	145.00	150.00

III — GRADING AND STRUCTURES, HALIFAX COUNTY

N. C. 4 & 561, 7.99 miles, Essex to Airline, R. L. Whitehead, Engineer, 14 bids on roadway ranging to $51,834: 7 on structures to $33,646.

Grading:

1. Blythe Bros. Co., Charlotte, N. C. (contract)	$33,092
2. Hendricks & Kennedy, Charlotte, N. C	33,729
3. C. O. Martin & Sons, Summerfield, N. C	34,889

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clearing	21 acre	$35.00	$50.00	$75.00
2. Grubbing	9 acre	35.00	100.00	125.00
3. Drainage ditches	8,000 c. y.	.35	.35	.40
4. Unclass. excav	66,300 c. y.	.20	.20	.195
5. Borrow excav	48,400 c. y.	.20	.18	.205
6. Overhaul	120,000 sta. y.	.005	.005	.005
7. R. C. pipe, 18 in	994 l. f.	1.50	1.55	1.70
8. R. C. pipe, 24 in	578 l. f.	2.50	2.60	2.75
9. R. C. pipe, 30 in	178 l. f.	4.00	4.00	4.00
10. R. C. pipe, 36 in	46 l. f.	6.00	6.00	5.00
11. R. C. pipe extension, 18 in.	8 l. f.	1.75	1.55	1.70
12. Relaid pipe, and under	34 l. f.	1.00	1.00	1.50
13. Concrete inlets	2 c. y.	50.00	40.00	35.00
14. Concrete headwalls	40 c. y.	22.00	22.00	20.00
15. Loose riprap	515 s. y.	1.25	2.50	.60
16. Reset fence	800 l. f.	.07	.04	.03
17. Frames for inlets	2 ea.	25.00	25.00	25.00

Structures:

1. Hobbs-Peabody Const. Co., Charlotte, N. C. (contract)	$28,639
2. J. M. Gregory, Raleigh, N. C	30,775
3. F. A. Triplett, Chester, S. C.	30,789

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Concrete, cl. A	957 c. y.	$23.00	$23.50	$24.90
2. Reinf. steel	165,700 lb.	.04	.05	.042

IV — STRUCTURES, NASH COUNTY

U. S. 301, north end Tar River Bridge, Rocky Mount-Whitakers, W. J. Overman, Engineer.

1. Kiker and Yount, Reidsville, N. C. (contract)	$55,052
2. Bowers Const. Co., Whiteville, N. C	57,282
3. Wannamaker and Wells, Orangeburg, S. C	58,870

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Concrete, cl. A	1,132 c. y.	$35.00	$39.00	$38.00
2. Reiforcing steel	160,420 lb.	.055	.046	.05
3. Untreated timber piles	265 l. f.	1.50	.60	1.50
4. Structural steel	27,500 lb.	.064	.051	.072
5. Conc. surfacing, Cl. H, liquifier	83 s. y.	12.00	10.00	13.00
6. Steel H. piles	1,980 l. f.	1.75	1.70	2.20

V — SIDEWALK ADDITION TO BRIDGE

U. S. 258, Neuse River Bridge, south to Kinston-Lenoir County, J. J. Gilbert, Engineer, four bids ranging to $7,019.00.

1. O. L. Shackleford, Kinston, N. C. (contract)	$5,689
2. Kiker and Yount, Reidsville, N. C	5,960
3. A. J. Pinkston & Co., Norfolk, Va	6,711

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Structural steel	41,130 lb.	$0.087	$0.085	$0.109
2. Creo. struct. timber	11.1 M.b.m.	145.00	150.00	156.00
3. Woven wire guard rail	799 l. f.	.60	1.00	.60

PAVING, DICKINSON, N. D.

OWNER: City of Dickinson, N. D.; L. W. Vergil, City Engineer.

PROJECT: Construction of asphalt and gravel subbase paving within city limits of Dickinson, N. D. under PWA financing.

BIDS: Seven bids were opened in November, 1937, ranging from the contract low of $58.080 to a high of $97,628, as compared with the engineer's estimate of $128,600.

LOW BIDDERS:

1. Megarry Bros., Bismarck, N. D. (contract)	$58,080
2. Northern Improvement Co., Fargo, N. D.	67,484
3. Summit Construction Co., Rapid City, S. D.	71,950

Item	Quan.	UNIT PRICES (1)	(2)	(3)
1. Earth excav., subgrade	18,545 c. y.	$0.25	$0.30	$0.70
2. Remove old concrete, 6 in.	19,840 s. f.	.05	0.5	.06
3. Remove misc. concrete	365 l. f.	.10	.10	.25
4. Integral curb and gutter	2,220 l. f.	1.00	.70	1.12
5. Circ. curb and gutter, 3, 6, 9, 16 ft. rad	1,100 l. f.	1.00	.70	1.12
6. Integral curb, 15 in., gutter, 18 in.	432 l. f.	1.00	.80	1.15
7. Integral curb, 12-15 in., gutter 18 in.	600 l. f.	1.00	.80	1.20
8. Crosswalk grates complete.	2 ea.	30.00	20.00	12.50
9. Header curbs, 4 x 12 in.	1,749 l. f.	.55	.40	.65
10. Separate curb, 10 in.	500 l. f.	.60	.40	.45
11. Separate curb, 12 in.	60 l. f.	.75	.40	.70
12. Separate gutter, pavement, walks, 6 in.	450 l. f.	.40	.40	.45
13. Rebuild conc. sand traps	6 ea.	30.00	70.00	70.00
14. adjust castings	7 ea.	5.00	5.00	15.00
15. Install mt. covers	6 ea.	10.00	20.00	20.00
16. Sidewalk, 3 in.	400 s. f.	.20	.30	.35
17. Manhole cover, rings	6 ea.	18.00	20.00	20.00
18. Premix material	15,170 ton	1.20	1.65	1.25
19. Furnish SC-6 for mix	188,100 ga.	.065	.08	.075
20. MC-1 for tack coat	25,300 ga.	.10	.10	.12
21. RC-1 for seal coat	33,700 ga.	.10	.10	.12
22. Sand for seal coat	350 c. y.	3.00	2.00	3.00
23. Furnish sub-base gravel	8,650 c. y.	.85	.90	.70
24. Furnish, haul, deposit water	1,000 m. g.	1.00	1.00	2.00

TEXAS HIGHWAYS

OWNER: State Highway Department, Austin, Texas.

PROJECT: Construction of 18.13 miles of flexible base and base preservative on U.S. 90, Jeff Davis County; 24.09 miles of flexible base and double asphalt surfacing on U.S. 60, Parmer County; 6.63 miles of grading and drainage structures on state Route 73, Austin County; 12.73 miles of grading, drainage structures and select materials on Route 23, McCulloch County; and 11.06 miles of roadside development, grading and planting on Route 21, Burleson County.

BIDS: Eleven bids were opened in December, 1937, for the Jeff Davis County project ranging from the contract low of $138,604 to a high of $197,121; nine on the Parmer County project ranging from contract low of $157,484 to $219,229; eleven on the Austin County project ranging from the contract low of $39,385 to $51,187; fourteen on the McCulloch County project ranging from the contract low of $77,482 to $113,623; and ten on the Burleson County project ranging from the contract low of $10,228 to $15,716.

I—FLEXIBLE BASE AND PRESERVATIVE, JEFF DAVIS COUNTY

1. J. S. Moore & Sons, Lufkin, Texas (contract)	$138,604
2. H. B. Zachry, Laredo, Texas	146,294
3. Ernest Lloyd, Fort Worth, Texas	146,654

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Road excav	26,487 c. y.	$0.10	$0.14	$0.10
2. Strip	7,671 c. y.	.10	.10	.12
3. Sprinkle	7,365 M. gal	1.70	2.25	1.60
4. Roll	1,420 hr.	1.25	2.00	2.00
5. Roll	2,357 hr.	2.50	2.50	2.00
6. Flexible base	122,733 c. y.	.49	.60	.55
7. Addtl. qtr. mile haul	1,564,070 c. y.	.016	.012	.017
8. Prime coat (603-G)	89,166 gal.	.094	.0825	.094
9. Asphalt (602-F)	144,718 gal.	.085	.0725	.085
10. Aggregate	3,619 c. y.	3.55	2.75	3.50
11. Mortar riprap	407 c. y.	6.00	6.00	6.00

II — FLEXIBLE BASE AND DOUBLE ASPHALT SURFACING, PARMER COUNTY

1. J. S. Moore & Sons, Lufkin, Texas, (contract)	$157,483
2. Uvalde Construction Co., Dallas, Texas	162,503
3. R. W. McKinney, Nacogdoches, Texas	163,696

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Road excav	41,183 c. y.	$0.05	$0.10	$0.10
2. Strip	24,300 c. y.	.10	.13	.10
3. Sprinkle	11,481 M. gal.	1.25	1.30	1.00
4. Roll	2,547 hr.	1.25	2.00	1.00
5. Flexible base	127,591 c. y.	.49	.45	.47
6. Addtl. qtr. mile haul	2,767,660 c. y.	.013	.015	.018
7. Prime coat (603-E)	93,511 gal.	.0832	.083	.079
8. Aggregate	4,252 c. y.	4.05	4.00	3.53
9. Asphalt	141,783 gal.	.0742	.071	.068
10. Caliche bound riprap	288 c. y.	5.00	5.00	4.50

III — GRADING AND DRAINAGE STRUCTURES, AUSTIN COUNTY

1. Howard Bros., Madisonville, Texas (contract)	$39,389
2. E. W. Hable, Corsicana, Texas	39,435
3. Briggs-Darby, Pharr, Texas	40,278

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clear, grub	48 acre	$30.00	$25.00	$40.00
2. Road excav	96,860 c. y.	.13	.12	.13
3. Channel excav	1,169 c. y.	.13	.18	.13
4. Borrow	34,914 c. y.	.13	.13	.13
5. Sta. haul	26,413 Sta. y.	.01	.01	.02
6. Quarter haul	58,976 Y. qtr.	.06	.04	.05
7. Blade embankment	699 hr.	2.00	1.90	2.00
8. Grass retards	279 c. y.	1.25	1.20	1.00
9. Water, grass	28 M. gal.	1.00	1.00	1.00
10. Install r. o. w. markers	55 ea.	.50	.60	.75
11. Uncl. struct. excav	536 c. y.	.60	1.00	1.00
12. Concrete Cl. A	644 c. y.	16.00	19.50	16.00
13. Reinf. steel	88,756 lb.	.04	.04	.045
14. Treated timber	5 MFBM	120.00	120.00	150.00
15. Railing type K	190 l. f.	1.50	1.50	1.50
16. Remove structures	4 ea.	7.00	5.00	6.00

IV — GRADING, DRAINAGE, McCULLOCH COUNTY

1. Cage Bros. & L. A. Turner, Bishop, Texas (contract)	$77,442
2. E. F. Bucy & Son, & C. T. Childs & Jensen Const. Co., Rising Star, Texas	80,527
3. Dean Word	80,733

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clear, grub	37 acre	$10.00	$20.00	$30.00
2. Com. road excav	60,768 c. y.	.16	.12	.14
3. Spec. road excav	81,883 c. y.	.16	.16	.14
4. Rock road excav	26,174 c. y.	.16	.40	.45
5. Channel excav	3,780 c. y.	.15	.12	.12
6. Blade embankment	577 hr.	3.00	2.50	2.50
7. Sledge embankment	1,800 hr.	.50	.50	.50
8. Special borrow	14,387 c. y.	.15	.13	.14
9. Sprinkle	305 M. gal.	1.00	1.50	1.50
10. Roll	305 hr.	2.00	1.75	1.50
11. Sta. haul	60,710 Sta. y.	.01	.02	.01
12. Quarter haul	171,465 Y. qtr.	.03	.04	.03
13. Uncl. struct. excav	1,076 c. y.	1.00	1.00	1.00
14. Concrete, Cl. A	1,473 c. y.	18.00	16.00	17.00
15. Reinf. steel	189,164 lb.	.04	.043	.0375
16. Mortar riprap	198 c. y.	6.00	5.25	6.00
17. Railing, type K	92 l. f.	2.00	2.25	1.50
18. Rock baffles	382 c. y.	3.00	2.15	3.00
19. R. o. w. markers	86 ea.	1.50	2.00	1.25
20. Remove structures	12 ea.	20.00	15.00	35.00

V — ROADSIDE DEVELOPMENT, BURLESON COUNTY

1. H. L. Butler, Dallas, Texas (contract)	$10,228
2. Emmett Sacks	10,388
3. R. B. Butler, Bryan, Texas	10,904

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Live oak B, B, 2 in. x 2½ in.	808 ea.	$4.00	$4.00	$4.20
2. Yucca, 1½–2 ft.	123 ea.	1.00	1.00	.85
3. Firethorn, B, B, S–3 ft.	779 ea.	2.00	1.60	1.75
4. Yaupon B, B, 3–4 ft.	126 ea.	2.00	2.50	1.85
5. Georgia cane, 4 eye clump	1,950 ea.	.20	.20	.25
6. Red bud, B, B, 4–5 ft.	90 ea.	1.25	1.50	1.50
7. Paul's Scarlet Rose, 2 yr.	74 ea.	.50	.70	.55
8. Hall's Honeysuckle, 2 yr.	236 ea.	.35	.20	.40
9. Solid sodding	841 c. y.	1.25	.80	1.00
10. Carpet grass sod	350 s. y.	.20	.20	.30
11. Topsoil	1,570 c. y.	.60	.80	.90
12. Road excav	1,782 c. y.	.25	.30	.30
13. Stan. grav. surf	512 c. y.	.75	1.00	.85
14. Addtl. ¼ mile haul	2,110 c. y.	.03	.03	.05
15. Mortar rubble masonry	31 c. y.	.17	.20	.18
16. Corr. metal pipe, 24 in.	58 l. f.	2.25	3.00	2.25
17. Corr. metal pipe, 12 in.	31 l. f.	1.75	2.00	1.25
18. Log railing	100 l. f.	.40	.30	.50
19. Park fixtures	4 set	70.00	75.00	100.00
20. Barbecue pit	1 ea.	40.00	50.00	50.00
21. Finish park area	3 acre	50.00	100.00	50.00
22. Cedar guard posts	86 ea.	.35	.30	.50
23. Erect wire mesh fence	705 l. f.	.35	.30	.30

AVERAGE PRICES ON KENTUCKY ROADS, 1934–1937

HIGHWAY contract unit prices showed a 1.5 percent increase for Kentucky state roads for the 12-month period ending March 31, 1937. This change is based on 72 comparable items of which 41 alone reflect the net increase. Comparison is also available for 51 items for the three year period ending March 31, 1937, indicating a 3.9 percent increase for 1935 over 1934 and an 11.0 percent increase for 1936 over 1935. The maximum changes occur in certain sizes of concrete sewer pipe, rock asphalt, structural steel, and lumber. A comparison of these average units are given in the following table furnished by the Kentucky state highway department.

		Ave. Prices for Year Ending		
Item	Unit	Mar. 31, 1935	Mar. 31, 1936	Mar. 31, 1937
1. Clear and grub	acre	$11.254	$14.752	$14.694
2. Remove trees and stumps	each	5.819	5.615	7.885
3. Excav., roadway and drainage, unclass	c. y.	.322	.336	.346
4. Excav., borrow, unclass	c. y.	.305	.302	.300
5. Excav., structure, unclass	c. y.	1.088	1.258	1.607
6. Excav., trench, shoulder	c. y	.182	.179	.156
7. Remove pipe	l. f.	.328	.339	.361
8. Relay pipe	l. f.	.346	.449	.375
9. Standard catch basins	each	50.556	51.311	......
10. Scarify and reshape	s. y.	.033	.017	.021
11. Remove sidewalk	s. y.	.184	.121	.202
12. Remove concrete masonry	c. y.	2.608	2.650	2.143
13. Remove stone masonry	c. y.	1.232	1.018	1.745
14. Remove headwalls	each	3.488	5.171	3.292
15. Corr. metal pipe, entrances, 15 in.	l. f.	1.217	1.224	1.224
16. Corr. metal pipe, entrances, 24 in.	l. f.	2.276	2.280	2.331
17. Corr. metal pipe, entrances, 36 in.	l. f.	......	4.000	......
18. Vitrified pipe, 12 in	l. f.	......	.750	1.043
19. Vitrified pipe, 15 in	l. f.	1.399	1.000	1.256
20. Vitrified pipe, 24 in	l. f	2.385	......	......
21. Reinf. conc, pipe, entrances, 15 in.	l. f.	1.102	1.225	1.256
22. Reinf. conc, pipe, entrances, 24 in.	l. f.	2.226	2.529	2.524
23. Vitrified drain pipe, 18 in	l. f.	1.408	1.504	1.400
24. Vitrified drain pipe, 24 in	l. f.	2.394	2.583	......
25. Reinf. conc, drain pipe, 12 in	l. f.	1.261	1.494	1.130
26. Reinf. conc, drain pipe, 15 in	l. f.	1.262	1.154	1.953
27. Reinf. conc, drain pipe, 18 in	l. f.	1.471	1.550	1.314
28. Reinf. conc, drain pipe, 24 in	l. f.	2.468	2.471	2.149
29. Reinf. conc, drain pipe, 36 in	l. f.	5.000	4.543	4.520
30. Reinf. conc, drain pipe, 48 in	l. f.	......	......	10.000
31. Reinf. conc. sewer, 8 in	l. f.	......	.428	......
32. Reinf. conc. sewer, 10 in	l. f.	......	.505	......
33. Reinf. conc. sewer, 12 in	l. f.	......	1.094	1.000
34. Reinf. conc. sewer, 15 in	l. f.	......	1.227	.867
35. Reinf. conc. sewer, 18 in	l f.	......	1.412	2.862
36. Reinf. conc. sewer, 24 in	l. f.	......	2.812	3.000
37. Reinf. conc. sewer, 30 in	l. f.	......	4.827	4.000
38. Cast iron pipe, 18 in	l. f.	......	2.750	......
39. Cast iron pipe, 24 in	l. f.	......	7.500	6.000
40. Concrete, Cl. A	c. y.	15.317	16.480	17.899
41. Concrete, Cl. B	c. y.	14.544	9.913	17.208
42. Concrete, Cl. D	c. y.	36.416	43.930	45.798
43. Stone masonry	c. y.	10.701	10.275	14.705
44. Culvert stone masonry	c. y.	8.070	9.222	12.285
45. Stone paving	s. y	1.599	1.663	1.000
46. Rip rap	s. y.	1.376	1.898	2.092
47. Reinforcing steel	lb.	.0385	.0395	.040
48. Structural steel	lb.	.0473	.0522	.056
49. Bronze expansion plates	lb.	.297	.324	.328
50. Pile treated lumber	l. f.	.832	.958	.832
51. Pile precast concrete	l. f.	2.739	2.559	2.499
52. Lumber, untreated	M.b.m.	......	45.185	61.543
53. Lumber, treated	M.b.m.	107.450	100.332	119.713
54. Crushed limestone	ton	1.577	1.465	1.653
55. Crushed sandstone	ton	1.300	1.650	1.562
56. Coarse aggregate, surface	ton	2.214	1.822	1.988
57. Crushed limestone chips	ton	2.260	1.823	2.142
58. Gravel	ton	.802	.836	.620
59. Rock asphalt	ton	10.940	10.452	12.489
60. Concrete base, paving	s. y.	1.776	1.744	2.000
61. Reinf. conc. paving	s. y.	1.694	1.775	1.988
62. Light oil	gal.	.094	.097	......
63. Asphalt cutback	gal.	.101	.082	......
64. Header curb	l. f.	.343	.500	.506
65. Conc. curb and gutter	l. f.	.924	.979	1.086
66. Conc. sidewalk	s. y	1.552	1.337	1.527
67. Conc. valley gutter	l. f.	1.438	1.662	1.482
68. Asphalt cutback paint coat	s. y.	.020	......	.034
69. Remove curb and gutter	l. f.	.123	.130	.161
70. Crushed slag	ton	2.370	......	......
71. Sheet asphalt binder	ton	7.217	15.950	7.179
72. Topeka mix, No. 4	ton	5.80	......	......
73. Rural pipe inlets	each	......	27.142	25.950
74. Manholes	each	......	143.839	84.250
75. Manhole frame and cover	each	......	15.000	20.000
76. Reset manhole tops	each	......	11.238	6.151
77. Remove stone fence	c. y.	......	.423	......
78. Napped sandstone for base	ton	......	1.750	......
79. Remove curb inlets	each	......	7.000	......
80. Remove catch basins	each	......	6.170	9.109
81. Asphalt cutback, MC-1	gal.	......	.086	.092
82. Asphalt cutback, RC-2	gal.	......	.086	.097
83. Curb, gutter, return inlets	each	......	32.407	41.195
84. Curb, gutter, box inlets	each	......	36.492	41.406
85. Cold laid asphalt binder	ton	......	......	10.000
86. Remove header curb	l. f.	......	......	.150
87. Overhaul	sta. yd	......	......	.020
88. Light tar	gal.	......	......	.13
89. Medium tar	gal	......	......	.1
90. Flumes	l. f.	......	......	1.50
91. Flume inlets	each	......	......	45.0
92. Integral curb	l. f.	......	......	.2

HIGHWAY CONSTRUCTION, GEORGIA

OWNER: Georgia Highway Dept.; Federal aid project.

PROJECT: Construction of 12.5 miles of bituminous surfacing and three bridges, including 160,383 cu.yd. excavation on the Macon-Columbus highway in Talbot Co. Ga.

BIDS: Five bids were opened June 4, 1937, ranging from contract low of $278,116 to a high of $296,081, with contract scheduled for completion within 250 days and minimum hourly wage rates stipulated of 20c. for common and 50c. for skilled labor and all materials required for construction furnished by the contractor.

LOW BIDDERS:

1. J. W. Gwinn Co. Inc., Birmingham, Ala. (contract)	$278.116
2. Hardway Const. Co. Columbus, Ga.	290.961
3. W. L. Cobb Const. Co. Decatur, Ga.	292.126

		Unit Prices		
Item	Quan.	(1)	(2)	(3)
1. Clear & grub	147,906 acre	$40.60	$24.34	$50.70
2. Clear & grub	12,800 acre	75.00	50.00	50.00
3. Excav. unclass., borrow	147,700 c. y.	.31	.28	.27
4. Selec. material, shoulder	unit- c. y.	.31	.65	.35
5. Ditch excav	10,423 c. y.	.50	.40	.35
6. Channel excav	1,525 c. y.	.80	1.00	.75
7. Excav. clvt. type struct.	735 c. y.	1.00	1.00	1.00
8. Hydraul. settlement	11,304 c. y.	.04	.05	.04
9. Overhaul, excavation	24,857 st. y.	.015	.015	.015
10. Pipe SD, 15 in.	1,100 l. f.	1.30	1.10	1.25
11. Pipe SD, 18 in.	160 l. f.	1.40	1.75	1.40
12. Pipe CD, 18 in.	298 l. f	1.30	1.75	1.40
13. Pipe CD, ext. 18 in.	814 l. f.	1.65	1.75	1.50
14. Pipe CD, ext. 24 in.	478 l. f.	2.40	3.00	2.50
15. Pipe CD, ext. 30 in.	10 l. f.	4.00	5.00	3.50
16. C. M. pipe, SD, ext. 15 in.	100 l. f.	1.30	1.75	1.50
17. C. M. pipe, SD, ext. 18 in.	10 l. f.	1.50	2.50	2.00
18. Remove, store guard rail	6,102 l. f.	.10	.25	.15
19. Remove clvt. pipe	165 l. f.	.60	.50	.50
20. Remove, relay clvt. pipe	829 l. f.	1.00	1.00	.75
21. Conc. Cl. B. hdwls., steps	283.07 c. y.	25.00	24.00	22.00
22. Conc. Cl. A. clvts	538.796 c. y.	28.00	24.00	22.00
23. Conc. Cl. B. hdwls. removed	37.04 c. y.	4.00	5.00	5.00
24. Conc. Cl. A. clvts. removed.	148.95 c. y.	5.00	5.00	5.00
25. Bar reinf. steel	38,987 lb.	.055	.05	.06
26. Plain riprap	112 c. y.	3.50	4.00	7.00
27. Grass slopes, shoulders	180,438 s. y.	.015	.025	.02
28. Conc. R/W markers	95 ea.	2.50	2.00	2.00
29. Arrows, FAP markers	2 ea.	3.00	5.00	5.00
30. Select mat'l, shoulders	11,097 c. y.	1.00	7.00	5.00
31. Local stone ditch checks	172.9 c. y.	3.00	5.00	5.00
32. Remove wood bridge	l. s.	.50	1.00	.50
33. Remove wood box	40 l. f.	.25	1.00	.50
34. Reset conc. R/W markers	46 ea.	1.00	1.00	1.00
35. Spillways, conc. type 4	2 ea.	25.00	50.00	25.00
36. Slope drain, conc.	17 l. f.	1.50	1.00	1.00
37. Sidewalk, conc. 4 in.	36 s. y.	1.50	2.00	2.00
38. Remove conc. steps	2.75 c. y.	4.00	10.00	5.00
39. Remove riprap	9.5 c. y.	3.00	2.00	5.00
40. Remove rubble hdwls.	1.5 c. y.	3.00	5.00	5.00
41. Remove corr. metal spillways	4 s. y.	1.00	5.00	7.50
42. Remove, rebuild stone wall.	90 l. f.	1.00	5.00	10.00
43. Raised edge curb	262 l. f.	.12	.25	.10
44. Doweled conc. curb, 6. in.	64.66 l. f.	.30	.50	.50
45. Bituminous prime	63,997 gal.	.14	.135	.14
46. Hot bitumen	81,917 gal.	.105	.11	.095
47. Bituminous seal	58,547 gal.	.11	.11	.12
48. Coarse agg. cover mat	4,390 ton	3.90	4.50	3.90
49. Fine agg. cover mat	1,763 ton	4.10	4.50	4.00
50. Finish, dress	146,338 s. y.	.02	.03	.02
51. Guard rail, type A, B.	6,109 l. f.	.75	.90	.75
52. Comp. cl. grav. base, 8 in.	162,601 s. y.	.55	.59	.68
53. Reinf. conc. approach slab.	160.02 s. y.	4.00	5.00	4.00
54. Conc. header, 6x8 in.	84 l. f.	1.00	.50	1.00
55. Sod ditch checks	1,829 s. y.	.65	.60	.50
56. Spreader boards	10,096 l. f.	.06	.15	.05
57. Remove, reset FAP markers.	2 ea.	1.00	3.00	4.00
BRIDGE CONSTRUCTION				
1. Conc. Cl. A	212 c. y.	$30.00	$27.50	$25.00
2. Reinf. steel	40,800 lb.	.06	.05	.05
3. Struct. steel, bridge No. 1.	l. s.	1,800.00	1,600.00	1,800.00
4. Treated timber, No. 16.	2.8 M.b.m.	130.00	140.00	150.00
5. Pile timber treated No. 16.	960 l. f.	1.50	1.75	1.50
6. Riprap	900 s. y.	3.00	2.00	2.00
7. Remove old bridge	l. s.	300.00	600.00	350.00
8. Test piles	2 ea.	150.00	100.00	100.00
9. Clear, grub	0.761 acre	100.00	150.00	500.00
10. Concrete paving, 4 in.	448 s. y.	1.50	1.50	1.50
11. Re-use Br. 2, riprap	l. s.	500.00	1,500.00	500.00
12. Re-use Br. 3, riprap	l. s.	500.00	1,500.00	500.00

UNIT BID PRICES—HIGHWAYS

HIGHWAY SURFACING, WASHINGTON

OWNER: State Highway Department, Washington; L. V. Murrow, Director.

PROJECT: Draining, grading and surfacing with crushed stone 3.28 miles of 20 ft. roadway on State Road No. 3, Whitman County.

BIDS: Ten bids ranged from contract low of $53,367 to a high of $76,350, with work awarded after May 18 opening.

CONDITIONS: Completion is scheduled for 120 days after contract award, with the contractor furnishing all labor and material required for the work.

LOW BIDDERS:

1. F. H. Deatley, Lewiston, Idaho (contract)...	$53,367
2. Guy J. Norris, Colfax, Wash..	56,994
3. Roy L. Bair, Spokane, Wash..	57,794

Item	Quan.	Unit Prices		
		(1)	(2)	(3)
1. Clear, grub	L. S.	$200.00	$225.00	$500.00
2. Excav. Cl. A	67,270 c. y.	0.17	0.18	0.17
3. Excav. rock	60 c. y.	2.00	1.25	1.20
4. Excav. struct	710 c. y.	.75	1.00	1.00
5. Excav. Cl. D	750 c. y.	.75	.50	.50
6. Overhaul, sta. yd	67,390 c. y.	.02	.015	.01
7. Overhaul, yd. mile	2,580 c. y.	.20	.15	.15
8. Slope treatment	19,440 l. f.	.06	.09	.06
9. Finish roadway	173.9	5.00	5.00	4.00
10. Stone surf., top course	2,900 c. y.	1.00	1.20	1.20
11. Stone surf., base course	5,300 c. y.	1.00	1.20	1.20
12. Stone surf., sub-base	18,150 c. y.	.85	1.00	1.15
13. Stone surf., top stackpile	1,260 c. y.	1.00	1.00	.90
14. Stone surf., sub-base stack	1,500 c. y.	.90	1.00	.80
15. Coarse screenings	2,100 c. y.	1.40	1.20	1.20
16. Fine screenings	480 c. y.	2.00	1.20	1.20
17. Water in place on rdwy	332 M-gals.	2.00	2.00	2.00
18. Conc. Cl. C	5.11 c. y.	30.00	30.00	28.00
19. Cl. riprap	50 c. y.	8.00	4.00	3.00
20. Reinf. conc. fed. aid markers	2 each	10.00	10.00	10.00
21. Reinf. conc. P/W markers	75 each	2.00	2.00	2.00
22. Remove wood guard rail	240 l. f.	.20	.25	.20
23. Remove tbr. & lbr. ditch coverings	L. S.	50.00	10.00	50.00
24. Remove conc. pipe headers	34 each	2.00	5.00	3.00
25. Relay corr. iron pipe, 18 in.	27 l. f.	.50	.50	.50
26. Relay conc. iron pipe, 18 in.	96 l. f.	.75	.60	.60
27. Relay conc. iron pipe, 24 in.	36 l. f.	.75	.75	.80
28. Relay conc. iron pipe, 36 in.	96 l. f.	1.00	1.25	1.20
29. Pl. conc pipe, 12 in	87 l. f.	1.35	1.00	1.10
30. Pl. conc. pipe, 18 in	99 l. f.	2.25	2.00	2.00
31. Std. reinf. conc. pipe, 18 in	687 l. f.	2.50	2.20	2.20
32. Std. reinf. conc. pipe, 24 in.	396 l. f.	3.75	3.15	3.20
33. Std. reinf. conc. pipe, 30 in.	45 l. f.	6.00	4.50	4.60
34. Std. reinf. conc. pipe, 48 in.	24 l. f.	12.00	10.00	11.00
35. Ex. Str reinf. conc. pipe, 48 in	44 l. f.	14.00	11.50	12.50

NEW ENGLAND HIGHWAYS

OWNER: State highway departments, Massachusetts, Maine and Vermont.

PROJECT: Three projects of bituminous concrete, cement concrete and gravel. All bids taken October, 1937. Description, location, bidders and unit prices given in following tabulations. Data courtesy New England Roadbuilders Ass'n.

I—Town of Dartmouth, Mass. Bit. conc., Cl. 1; 3,600 l.f., 10 to 32 ft. wide. Five bids, $14,074 to $19,292.

1. Sherry Corp., Fall River, Mass.	$14,074
2. Frank Toner Est., North Attleboro, Mass.	14,891
3. S. Triconi, Waltham, Mass.	15,583

II—Town of Athol, Mass. Gravel surf., M.I.P.; 3,550 l.f. Seven bids, $6,879 to $8,934.

1. Geo. E. Duteau, Springfield, Mass.	$6,879
2. V. Arcangeli, Westminster, Mass.	7,212
3. Frank Briguglio & Co., Medford, Mass.	7,640

III—Towns of Topsham and Bowdoin, Me. Reinf. conc., 20 ft. wide; 2.175 mi. Three bids $115,485 to $130,671.

1. Lane Const. Co., Meriden, Conn.	$115,485
2. Bridge Const. Co., Augusta, Me.	117,059
3. Wyman & Simpson, Inc., Augusta, Me.	130,671

I — TOWN OF DARTMOUTH, MASS

Item	Quan.	Unit Prices		
		(1)	(2)	(3)
1. Earth excavation	2,300 c. y.	$0.35	$0.40	$0.40
2. Ledge excavation	10 c. y	2.00	2.00	3.00
3. Cem. conc. mas. Cl. D	1 c. y.	18.00	15.00	20.00
4. Broken stone base	470 c. y	3.00	4.00	4.25
5. Bit. asphalt, OA-4	8,500 gal...	.09	.12	.11
6. Vit. clay, cem. conc. pipe, 10 in	1,616 l. f	.50	.45	.50
7. Vit. clay, cem. conc. pipe, 12 in	404 l. f.	.65	.55	.59
8. Ctd. corr. metal pipe, 10 in	18 l. f.	1.10	1.20	1.35
9. C.i. culvert, lt.wght.18 in.	46 l. f.	2.25	2.75	4.00
10. Catch basins	10 each	45.00	50.00	40.00
11. Remove, rebuild stone walls	180 l. f.	.40	.60	.55
12. Side drains, clay, metal pipe, 10 in.	44 l. f.	1.00	.60	1.50
13. Side drains, clay, metal pipe, 12 in.	556 l. f.	1.15	.55	1.50
14. Gravel borrow	1,900 c. y.	.50	.70	.55
15. Strip gravel pits	190 c. y	.10	.10	.10
16. Gr. vert. curb, type B	470 l. f.	1.15	1.05	1.15
17. Manholes	9 each	45.00	50.00	40.00
18. Fine gr. Rl. & fin	8,300 s. y.	.03	.03	.03
19. Conc. curb inlets	8 each	12.00	10.00	7.00
20. Trench excavation	1,850 c. y.	.90	.70	.85
21. Loan borrow	130 c. y.	1.00	1.00	1.00
22. Trench ledge excava	50 c. y.	3.00	3.00	3.00
23. Seeding	700 s. y.	.05	.05	.20
24. Bit. concrete, cl. I	660 ton	6.00	6.50	6.40
25. Granite curb corners	3 each	10.00	7.00	8.00
26. Remove, reset cobble edgestone	265 l. f.	.30	.30	.35
27. Remove, reset cobble paving	25 s. y.	1.50	.50	1.00
28. Special catch basin	1 each	75.00	150.00	75.00
29. Conc. ext. stones	16 each	.50	2.00	2.00
30. Perf. ctd. corr. metal pipe, 12 in	130 l. f.	1.75	1.40	2.25

II — TOWN OF ATHOL, MASS.

Item	Quan.	Unit Prices		
		(1)	(2)	(3)
1. Earth excavation	1,500 c. y.	$0.50	$0.50	$0.47
2. Ledge excavation	150 c. y.	2.50	3.00	2.25
3. Cem. conc. Mas. cl. D	40 c. y.	17.00	16.00	20.00
4. Cem. conc. Mas. cl. C	3 c. y.	17.00	20.00	18.00
5. Tar, TM-1	8,800 gal.	.11	.13	.11
6. Vit. clay, conc. sewer, 12 in	114 l. f.	1.00	.60	.55
7. Ctd. cor. metal pipe, 12 in.	148 l. f.	1.50	1.20	1.25
8. Ctd. cor. metal pipe, 18 in.	84 l. f.	2.00	2.00	2.25
9. Bounds	23 each	2.50	3.50	6.00
10. Remove trees	6 each	8.00	10.00	15.00
11. Gravel borrow	3,600 c. y.	.60	.50	.70
12. Sand borrow	110 c. y.	.60	1.25	1.00
13. Strip gravel pit	410 c. y.	.15	.20	.15
14. Gravel surfacing	510 c. y.	.75	.90	.85
15. Stock fence	610 l. f.	.20	.35	.40
16. Fine gr. rl. & fin	12,500 s. y.	.03	.03	.03
17. Reinf. cem. conc. strs	300 lb.	.07	.10	.06
18. Dry stone masonry	5 c. y.	5.00	8.00	7.00
19. Remove, relay vit. clay pipe, 12 in	40 l. f.	1.00	75.00	.75
20. Trench excavation	200 c. y.	.60	1.75	.95
21. Trench ledge excav	20 c. y.	3.00	3.00	3.50
22. Concrete guard posts	12 each	1.00	3.00	2.00

III — TOWNS OF TOPSHAM & BOWDOIN, ME.

Item	Quan.	Unit Prices		
		(1)	(2)	(3)
1. Clear and grub	2 a.	$175.00	$100.00	$200.00
2. Earth excavation	15,000 c. y.	.95	.50	.60
3. Rock excavation	4,200 c. y.	.95	3.00	3.00
4. Remove trees	50 each	10.00	10.00	10.00
5. Structure excav	1,100 c. y.	1.70	2.00	1.50
6. Stone fill	2,400 c. y.	1.50	2.00	1.20
7. Common borrow	5,200 c. y.	.40	.40	.50
8 Gravel subbase	300 c. y	.70	.70	1.00
9. Gravel base course	14,000 c. y.	.70	.70	1.00
10. Stone base course	800 c. y.	2.00	2.00	2.00
11. Gravel surface course	700 c. y.	1.50	1.50	1.10
12. Cem. concrete pave	5,154 c. y.	10.00	10.00	11.00
13. Steel reinf., pave	278,320 lb.	.05	.045	0.58
14. Concrete, cl. A	24 c. y.	18.00	20.00	18.00
15. Concrete, cl. B	102 c. y.	18.00	18.60	20.00
16. Structure reinf	2,850 lb.	.05	.05	.07
17. Cement rubble masonry	12 c. y.	15.00	10.00	15.00
18. Corr. metal pipe, 12 in	310 l. f.	1.25	1.25	1.30
19. Corr. metal pipe, 15 in	60 l. f.	1.50	1.60	1.60
20. A. C. corr. metal pipe, 24 in.	54 l. f.	3.25	3.25	3.30
21. Reinf. conc. pipe, 15 in	128 l. f.	1.50	1.50	2.00
22. Reinf. conc. pipe, 18 in	412 l. f.	2.00	2.00	2.50
23. Reinf. conc. pipe, 24 in	168 l. f.	3.00	2.50	3.00
24. Underdrain, type A	1,000 l. f.	1.00	1.20	1.25
25. Wire cable guard rail	7,312 l. f.	.40	.38	.40
26. Cable guard anchorage	64 each	8.00	9.00	9.00
27. Loam	375 c. y.	1.50	1.00	1.50
28. Sodding	300 s. y.	.50	.60	.50
29. Bit. treatment	3,200 gal.	.18	.16	.20
30. Scarify old bitum. surf	1,600 s. y.	.15	.10	.07

UNIT BID PRICES—BRIDGES

HIGHWAY UNDERPASS, IOWA

OWNER: Iowa State Highway Commission; F. R. White, Chief Engineer, Ames, Ia.

PROJECT: Underpass in Ames, Ia., on Grand Ave., U. S. No. 69, composed of 88.5 ft. continuous I-beam span, 32-ft. roadway and two 5-ft. walks at Main St.; 92-ft. three-span I-beam bridge over four railroad tracks; 77.5-ft. plate girder with I-beam approach spans for single track; also including grading, storm sewer, paving and street lighting system, with C. & N. W. R. R. to build track work and falsework.

BIDS: Five bids were submitted ranging from the contract low, awarded in September, 1937, for $282,822, to a high of $335,936, with completion scheduled for August, 1938, and minimum hourly wages stipulated of 75c. for skilled and 50c. for common labor.

LOW BIDDERS:

1. Ben Cole & Son, Ames, Ia. (contract)	$282,822
2. Koss Const. Co., Des Moines, Ia.	289,510
3. Massman Const. Co., Kansas City, Mo.	305.397

Item	Quan.	Unit Prices		
		(1)	(2)	(3)
1. Concrete, Cl. A	1,085.7 c. y.	$20.00	$20.00	$21.00
2. Concrete, Cl. B	1,623.0 c. y.	17.00	18.50	21.00
3. Reinforcing steel	135,545 lb.	.04	.045	.04
4. Structural steel	1,111,533 lb.	.07	.069	.073
5. Wrought iron	175,160 lb.	.09	.08	.08
6. Creosoted piling	6,685 l f.	1.00	1.00	1.10
7. Handrail steel	43,940 lb.	.13	.14	.20
8. Untreated piling	8,580 l. f.	.70	.75	.70
9. Test piling	210 l. f.	2.00	2.00	3.00
10. Excav. Cl. 1	3,532 c. y.	1.50	3.00	3.00
11. Backfill	788 c. y.	1.00	.75	.50
12. Fiber conduit, 3 in	132 l. f.	.50	.50	1.00
13. Waterproofing	104 sq.	4.00	12.50	40.00
14. Asphalt plank	818 s. y.	3.00	1.75	5.00
15. Asphalt mastic	27.6 c. y.	21.00	80.00	60.00
16. Crushed rock	25 c. y.	3.00	3.20	4.00
17. Corr. pipe, perf., 6 in	361 l. f.	2.00	1.25	1.00
18. Corr. pipe, 6 in	272 l. f.	1.50	.75	1.00
19. Corr. pipe, semi-c, 8 in	1,042.2 l. f.	2.50	.75	1.00
20. End drains	58 l. f.	2.00	2.00	2.00
21. Store room specialties	.... L. S.	250.00	200.00	750.00
22. Lighting, wiring	.... L. S.	3,800.00	3,550.00	5,000.00
23. Roadway excavation	48,194 c. y.	.51	.50	.40
24. Backfill, por. subgrade	4,196 c. y.	1.00	.95	1.00
25. Backfill, topsoil	1,942 c. y.	1.50	0.50	0.75
26. Sodding	7,500 s. y.	.20	.40	.20
27. Storm sewer comp., 30 in	1,471 l. f.	11.75	12.50	9.00
28. Storm sewer comp., 24 in	84 l. f.	3.00	3.00	5.00
29. Storm sewer comp., 18 in	180 l. f.	2.00	2.00	3.00
30. Storm sewer comp., 15 in	368 l. f.	1.40	1.70	2.50
31. Reinf. conc., headwall	1.96 c. y.	25.00	25.00	30.00
32. Drain tile comp., 12 in	822 l. f.	.75	.75	.75
33. Drain tile comp., 8 in	1,140 l. f.	.45	.50	.50
34. Drain tile comp., 6 in	1,875 l. f.	.40	.30	.40
35. Backfill, por. tile	300 c. y.	3.50	2.50	2.00
36. Manholes	4 ea.	175.00	350.00	400.00
37. Intakes, 1 unit, type E	8 ea.	70.00	60.00	50.00
38. Intakes, 2 unit, type E	6 ea.	125.00	100.00	75.00
39. Intakes, 4 unit, type E	2 ea.	210.00	200.00	100.00
40. Intakes, 1 unit, type SG	6 ea.	23.50	100.00	75.00
41. Intakes, 2 unit, type SG	2 ea.	45.00	200.00	80.00
42. Sidewalk gutter plates	12 ea.	15.00	10.00	25.00
43. Concrete pavement	13,296 s. y.	2.50	2.50	2.85
44. Concrete sidewalk	17,000 s. f.	.20	.17	.22
45. Concrete drives	5,850 s. f.	.25	.25	.45
46. Conc. sidewalk-gutter	1,450 l. f.	.40	1.00	1.00
47. Surfacing material	330 c. y.	1.00	1.50	1.50
48. Metal culvert, corr., 24 in.	50 l. f.	2.00	2.50	3.00
49. Metal culvert, corr., 15 in.	100 l. f.	1.75	1.50	2.00
50. Galv. pipe, 2 in	1,824 l. f.	.60	.60	1.00
51. Sprinkler hydrants	16 ea.	20.00	35.00	25.00

MERRIMAC RIVER BRIDGE, N. H.

OWNER: State Highway Department, Concord, N. H., John W. Childs, Bridge Engineer.

PROJECT: Steel truss bridge and approaches, 450 ft. overall, over Merrimac River at Boscawen-Canterbury, consisting of two 168-ft. steel Pratt truss spans, and two I-beam approach spans, 50 and 57 ft. respectively. Vertical clearance 14.08 ft. Roadway width 18 ft.

BIDS: Nine bids were opened in April, 1937 ranging from the contract low of $73,852 to a high of $88,491.

CONDITIONS: Labor is limited to 130 hr. per month under W.P.F.R. conditions with wages stipulated at minimums of 75c. for skilled and 40c. for common. Foundation conditions are unstable; all materials required in the construction are to be furnished by the contractor.

LOW BIDDERS:

1. M. DeGroot, Jericho, Vt. (contract)	$73,85
2. Chas. I. Hosmer Inc., Greenfield, Mass.	73,9
3. L. E. McLaughlin Inc., New London, Conn.	76,18

Item	Quan.	UNIT PRICES		
		(1)	(2)	(3
1. Clear and grub	0.05 acre	$200.00	$100.00	$1,000
2. Remove trees	12 each	10.00	15.00	20
3. Fine grading	521 l. f.	.10	.20	[illegible]
4. Earth excavation	259 c. y.	.40	1.00	1[illegible]
5. Ledge excavation	80 c. y.	1.00	1.00	1.00
6. Earth borrow	3,344 c. y.	.50	.50	[illegible]
7. Gravel base course	166 c. y.	.70	1.00	1.00
8. Gravel surface course	161 c. y.	1.00	1.00	1[illegible]
9. Bituminous surface	835 gal.	.15	.18	.1[illegible]
10. Wood guard rail	656 l. f.	.80	.60	.50
11. Reinforcing steel	79,424 lb.	.05	.05	.06
12. Concrete, Cl. A	196 c. y.	20.00	18.00	17.00
13. Concrete, Cl. B	471 c. y.	17.00	18.00	20.00
14. Concrete, Cl. D	9 c. y.	20.00	20.00	20.00
15. Corr. metal pipe, 12 in	22 l. f.	2.00	2.00	1.00
16. Reinf. conc. pipe, 48 in	112 l. f.	8.00	10.00	12.00
17. Riprap, Cl. A	700 c y.	2.75	3.00	5.00
18. Riprap, Cl. C	70 c. y.	2.75	3.00	4.00
19. Structural steel	448,650 lb.	.07	.0755	.07
20. Struct. excav. unclass	336 c. y.	10.00	5.00	7.50
21. Steel sheet piling	82 ton	100.00	80.00	125.00
22. Untreated timber piles	4,160 l. f.	.65	.60	.40
23. Treated timber piles	900 l. f.	.90	1.00	1.00
24. Remove superstructure	1 each	2,000.00	800.00	1,500.00
25. Remove substructure	1,928 c. y.	1.50	2.20	.50
26. Stone fill, piers	190 c. y.	2.00	3.00	5.00

HIGHWAY UNDERPASS, ARIZONA

OWNER: Highway Dept. Arizona, Southern Pacific R. R.

PROJECT: Construction of highway underpass beneath the Southern Pacific R. R. on Mill Ave., on the Tempe-Chandler Highway, ¼ mile south of Tempe, Ariz.

BIDS: Opened April 27, 1937. Seven bids ranged from the contract low of $77,431 to a high of $81,509. Completion is cheduled for Nov. 15, 1937.

MATERIALS FURNISHED: The contractor furnishes all materials required for the complete project.

LOW BIDDERS:

1. Vinson & Pringle, Phoenix, Ariz. (contract)	$77,431
2. Pearson & Dickerson Contrs., Inc., Tempe, Ariz.	79,445
3. W. E. Hall Co., Phoenix, Ariz.	79,746

Item	Quan.	UNIT PRICES		
		(1)	(2)	(3)
1. Drainage excav. unclass	1,355 c. y.	$0.42	$0.25	$0.38
2. Struct. excav. unclass	11,014 c. y.	.34	1.33	.5
3. Overhaul, sta. yd	10.142 c. y.	.025	.015	.02
4. Overhaul, cu. yd. mile	3,892 c. y.	.17	.20	15
5. Select material	1,246 c. y.	.80	.50	.50
6. Sprinkling	36 M. g.	1.40	.125	4.00
7. Rolling	72 hr.	3.00	2.50	4.00
8. Conc. paving, 6 in	2,788 s. y	2.00	2.00	2.45
9. Conc. paving, 7 in	525 s. y.	2.00	2.25	2.75
10. Remove conc. pavement	2,700 s. y.	.50	.25	.50
11. Concrete, Cl. A	653 c. y.	23.00	20.50	19.00
12. Concrete, Cl. D	415 c. y.	24.00	20.50	20.00
13. Reinforcing steel	150,410 lb.	.052	.049	.055
14. Corrugated metal pipe, 36 in	10 l. f.	6.00	5.00	5.00
15. Std. line fence	3,210 l. f.	.09	.12	.08
16. Markers	12 each	2.50	3.50	4.00
17. Single curb	1,860 l. f.	.78	.70	.75
18. Comb. curb. gutter	1,801 l. f.	1.40	.95	1.20
19. Conc. slab, curb and handrail	total	70.00	135.00	500.00
20. Catch basins and grates	total	650.00	625.00	1,500.00
21. Gunite, 2 in. reinf	26,460 s. f.	.29	.29	.28
22. Gunite, 1.5 in., reinf	14,850 s. f.	.22	.21	.23
23. Concrete sidewalk, 4 in	10,427 s. f.	.25	.17	.23
24. Lead seal, 1/16 x 5 in	600 l. f.	.80	.55	.65
25. Lead seal, 1/16 x 9 in	503 l. f.	1.20	.90	1.00
26. Steel irrig. pipe, etc	total	1,900.00	1,750.00	1,500.00
27. Sodium lamps, standards	2 each	210.00	225.00	300.00
28. Membr., asph. plank waterpfg	total	2,000.00	1,900.00	2,000.00
29. Shoofly pav't., remove, place	total	400.00	700.00	1,000.00
30. Conc. pipe, 18 in	42 l. f.	2.50	2.40	3.00
31. Conc. pipe, 24 in. (in siphon)	10 l. f.	2.50	3.50	5.00
32. Pump, 250 g. p. m., elec.	1 each	600.00	625.00	900.00
33. Pump, 1000 g. p. m., gas	1 each	3,000.00	2,100.00	3,000.00
34. Electrical system	total	1,500.00	600.00	1,000.00
35. Outlet discharge, 10 in	total	500.00	85.00	300.00

HIGHWAY BRIDGE, WASHINGTON

OWNER: State Highway Department, Washington; L. V. Murrow, Director.

PROJECT: Construction of 715 ft. overall reinforced concrete bridge, and approaches, consisting of 240 ft. steel truss and 475 ft. of concrete approach spans, with 24 ft. roadway, at Satsop River, Grays Harbor County.

BIDS: Eleven bids were opened on May 18, 1937, ranging from the contract low of $172,245 to a high of $205,845.

CONDITIONS: Work is scheduled for completion within 270 days after contract award, with contractor furnishing all necessary materials for the construction.

LOW BIDDERS:

1. C. L. Creelman, Seattle, Wash. (contract)	$172.245
2. Newton Construction Co. Seattle, Wash.	175,091
3. Teufel & Carlson, Seattle, Wash.	176,284

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clear	197 acres	$300.00	$100.00	$150.00
2. Grub	175 acres	300.00	100.00	200.00
3. Excav. unclass	27,990 c. y.	.30	.40	.32
4. Excav. struct	190 c. y.	1.00	1.00	1.25
5. Excav. Cl. D	470 c. y.	1.00	.50	.75
6. Slope treatment	500 l. f.	.15	.08	.06
7. Finish roadway	210	10.00	8.00	6.00
8. Select roadway borrow	2,640 c. y.	.70	.50	.40
9. Gravel backfill	20 c. y.	3.00	2.00	3.00
10. Conc. pavt. std	2,237 s. y.	2.50	2.65	2.04
11. Conc. pavt. early set	2,571 s. y.	2.75	2.80	2.29
12. Pavt. header No. 3	40 l. f.	1.25	1.00	.85
13. Reinf. conc. gutter	1,167 l. f.	1.00	.75	.70
14. Pavt. reinf. type 2	6,750 lbs.	.06	.06	.06
15. Dowel bars, caps	700 each	.25	.25	.25
16. Dowel bars, only	2,080 each	.20	.15	.20
17. Conc. Cl B	5,180 c. y.	25.00	23.00	20.00
18. Steel reinf. bars	7,300 lb.	.06	.055	.06
19. Reinf. conc. fed. aid markers	2 each	20.00	8.00	6.50
20. Cable guard rail, des. 6	2,020 l. f.	.75	.75	.70
21. Conc. catch basin, C. 1, cover	1 each	120.00	40.00	45.00
22. Plug twin arch culvert	total	75.00	50.00	45.00
23. Remove pavt	4,140 s. y.	.50	.60	.50
24. Plain conc. sewer pipe, 8 in.	40 l. f.	.75	1.00	.65
25. Plain conc. sewer pipe, 18 in	120 l. f.	2.50	1.75	1.75
26. Structure excav	2,470 c. y.	6.00	7.00	4.00
27. Conc. Cl. A	820 c. y.	25.00	23.00	30.00
28. Conc. Cl B	745 c. y.	25.00	23.00	25.00
29. Conc. Cl. D	412 c. y.	20.00	23.00	15.00
30. Steel reinf. bars	298,000 lb.	.052	.05	.06
31. Struct. silicon steel	149,000 lb.	.089	.092	.09
32. Struct. carbon	346,000 lb.	.084	.085	.088
33. Cast steel	5,500 lb.	.14	.15	.20
34. Copper seals	120 lb.	1.00	1.00	1.00
35. Cast steel drains	15 each	22.00	25.00	30.00
36. Precast conc. piling	4,080 l. f.	3.00	3.00	3.50
37. Reinf. conc. railing	948 l. f.	3.00	3.00	4.00
38. Reflector units	4 each	15.00	10.00	10.00
49. Furnish, drive conc. test piles	2 each	150.00	150.00	150.00
30. Install hardware, gaging equip	total	250.00	50.00	300.00
41. Remove old bridge	total	2,200.00	3,000.00	5,820.00

HIGHWAY UNDERPASS, NO. DAK.

OWNER: State Highway Dept., Fargo, N. D.; Clifford Johnson, engineer.

PROJECT: Reconstruction of Tenth St. underpass at N.P.R.R. crossing in Fargo, N. D., including the removal of existing timber structures and the construction of steel and concrete structure with 32 ft. roadway and 2 sidewalks under 9 tracks and part of freight house and platforms, and the removing of present concrete deck and centre pier under Front St. and replacing them with single steel and concrete span on old abutments.

BIDS: Five bids were opened and contract awarded June 1937. The bids ranged from the contract low of $257,983 to a high of $314,312, with minimum hourly wages stipulated of 80c. for skilled and 50c. for common labor, and completion scheduled for 250 working days after award.

LOW BIDDERS:

1. A. Guthrie Co., Inc., Minneapolis, Minn. (contract)	$257.983
2. Industrial Contracting Co. & A. A. Prendergast. Minneapolis, Minn.	264.670
3. Rue Construction Co., Bismarck, N. D.	264,995

Item	Quan.	Unit Prices (1)	(2)	(3)
I — Paving, Incidental Items, West Approach				
1. Relay paving brick	452 s. y.	$2.00	$1.45	$1.60
2. Conc. shim	34.5 c. y.	15.00	16.50	25.00
3. Install conc. paving	4.1 s. y.	3.50	4.00	3.20
4. Remove conc. paving	6.7 s. y.	1.00	3.00	.70
5. Remove conc. curb	116.6 l. f.	.25	1.25	.40
6. Remove conc. header	35.0 l. f.	.25	.20	.30
7. Remove conc. curb	30.5 l. f.	.25	.30	.30
8. Adjust m.h. castings	1 no.	25.00	17.50	20.00
9. Remove brick paving	452 s. y.	1.00	.55	.50
10. Remove conc. sidewalk	39.0 s. f.	.05	.15	.10
11. Install conc. sidewalk	39.0 s. f.	.20	.21	.25
12. Install conc. curb, gutter.	46.5 l. f.	.95	1.30	1.10
13. Install c.c. str. type 1	27.5 l. f.	1.05	1.70	1.60
14. Install c.c. curved type	3.0 l. f.	1.05	1.70	1.70
15. Install c.c. str. type 6	44.2 l. f.	1.15	1.45	1.25
16. Install c.c. curved type 6.	25.9 l. f.	1.15	1.45	1.35
II — Paving, Incidental Items, East Approach				
17. Relay paving brick	445 s. y.	2.00	1.45	1.60
18. Conc. shim	33.5 c. y.	15.00	16.50	25.00
19. Adjust water valves	2 no.	25.00	14.50	25.00
20. Adjust catch basins	2 no.	25.00	17.50	20.00
21. Remove brick paving	445 s. y.	1.00	0.55	0.50
22. Remove conc. base	55.9 s. y.	1.00	1.00	.50
23. Install conc. base, 7 in.	55.9 s. y.	3.50	2.50	2.00
24. Remove gran. block paving	129.9 s. y.	1.00	.75	.60
25. Relay gran. block paving.	129.9 s. y.	2.00	2.00	1.75
III — Roadway Items				
26. Excav. unclass	782 c. y.	1.50	.75	1.10
27. Spec. curb inlets	6 ea.	35.00	72.00	80.00
28. Sand, gravel fill	1,257 c. y.	1.50	1.80	2.50
29. New sump, sump pump	1 l. s.	3,800.00	5,850.00	5,000.00
30. Manhole, sump	4 ea.	100.00	235.00	100.00
31. Reinf. conc. manhole	1 ea.	170.00	260.00	300.00
32. Curb inlets	2 ea.	30.00	75.00	75.00
33. V. p. drains, 8 in	1,120 l. f.	1.40	1.25	1.10
34. V. p. drains, 10 in	360 l. f.	1.55	.75	1.30
35. V. p. drains, 12 in	401 l. f.	1.75	2.55	2.00
36. C. i. p. drains, 8 in	203.5 l. f.	2.60	4.15	3.00
37. C. i. p. drains, 12 in	24 l. f.	3.70	6.00	5.00
38. Water pipe protection	1 ea.	200.00	705.00	300.00
39. Conc. curb, str. type 1	116.2 l. f.	1.05	1.70	1.70
40. Conc. curb, curved type 1	366.1 l. f.	1.05	1.70	1.80
41. Conc. curb, str. type 2	174.8 l. f.	2.30	2.45	3.20
42. Conc. curb, gutter, str. type 4	20.2 l. f.	2.40	4.60	5.00
43. Conc. curb, gutter, str. type 5	360.6 l. f.	1.80	2.10	2.50
44. Conc. Cl. "A"	37.8 c. y.	20.00	28.15	20.00
45. Reinf. steel	1,585 lb.	.05	.058	.055
46. Install conc. sidewalk	10,840.8 s. f.	.20	.21	.25
47. Install reinf. conc. paving	1,040.3 s. y.	3.50	3.30	3.30
48. Fill old sump	1 ea.	100.00	125.00	250.00
49. Remove conc. retaining wall	203.8 l. f.	1.00	.60	1.00
50. Remove conc. sidewalk	635 s. f.	.10	.15	.10
51. Remove conc. curb	1,232.8 l. f.	.15	.30	.40
52. Remove spec. center curb	170 l. f.	.15	1.95	2.00
53. Remove conc. tile sidewalk	12,039 s. f.	.10	.0325	.10
54. Remove conc. paving	672 s. y.	1.00	3.00	1.00
55. Remove brick paving	920 s. y.	1.00	.55	.60
56. Remove reinf. conc. base.	393 s. y.	1.50	3.00	.50
57. Remove catch basin	8 ea.	10.00	11.75	20.00
58. Remove manholes	2 ea.	10.00	30.00	20.00
59. Vit. pipe drains, 6 in	222 l. f.	.50	.60	.75
IV — Structural Items				
60. Temp. bridge work	l. s.	18,500.00	12,540.00	13,500.00
61. Remove, dispose timber struct	l. s.	4,500.00	6,700.00	1,500.00
62. Changes to fr't house platforms	l. s.	1,000.00	4,075.00	2,000.00
63. Remove conc. center pier, deck	l. s.	4,000.00	7,700.00	9,000.00
64. Excav. dry struct	5,082 c. y.	1.25	2.05	1.00
65. Furn. treated timber piling	19,680 l. f.	1.00	1.05	1.40
66. Drive treated tim. piling.	19,680 l. f.	.15	.10	.05
67. Conc. Cl. A., abutments.	1,255.5 c. y.	23.50	22.80	22.00
68. Conc. Cl. A., slabs	297.8 c. y.	20.30	23.50	26.00
69. Conc. Cl. A., retain'g wall	1,385.3 c. y.	21.25	18.40	16.00
70. Conc. crib. walls	1,376 s. f.	1.75	1.25	1.50
71. Struct. steel	602,000 lb.	.05	.057	.06
72. Spec. ballast plates	46,100 lb.	.086	.095	.07
73. Comp. steel, conc. deck. slabs	3,060 s. f.	1.25	1.45	1.20
74. Zinc plate, 22 gauge	538 s. f.	.35	.95	1.20
75. G.i.p., 5 in diam, 22 gauge	64 l. f.	.50	.75	2.00
76. Waterproof membrane, 3 ply	1,632 l. f.	.30	.44	.45
77. Asphalt waterproof, 1 coat	2,295 s. f.	.04	.05	.05
78. Asphalt w.p. 2 coats	15,873 s. f.	.05	.07	.08
79. W.p. membrane, two ply.	9,915 s. f.	.20	.12	.25
80. Asphalt plank	9,915 s. f.	.20	.29	.25
81. Pipe railings	177 l. f.	1.00	1.50	1.20
82. 3 bar pipe railing	334.5 l. f.	2.25	2.75	2.20
83. 2 bar pipe railing	1,610.75 l. f.	1.20	1.85	1.30
84. Ornamental railing	570 l. f.	6.75	7.10	6.20
85. Lighting system	1 ea.	2,500.00	1,245.00	900.00
86. Conc. Cl. B	2,199.1 c. y.	15.50	12.45	16.00
87. Reinforcing steel	367,544 lb.	.05	.049	.055

UNIT BID PRICES—BRIDGES

HIGHWAY BRIDGE, LA.

OWNER: State Highway Commission, Baton Rouge, La.

PROJECT: Construction of Bayou Bartholomew Bridge, consisting of one 100-ft. low steel truss span on concrete piers with timber pile foundations, and twelve 40-ft reinforced concrete deck girder approach spans on reinforced concrete bents, on Bastrop-Beekman highway, Morehouse Parish, La.

BIDS: Nine bids were received in November, 1937, ranging from $60,683 to a high of $69,934, with all materials to be furnished by the contractor.

LOW BIDDERS:

1. List & Weatherly Const. Co., Baton Rouge	$60,683
2. T. L. James & Co., Inc., Baton Rouge	62,174
3. Pittsburgh-Des Moines Steel Co., Baton Rouge	64,499

Item	Quan.	Unit Price (1)	(2)	(3)
1. Concrete, cl. AA	702.03 c. y.	$24.30	$24.00	$26.00
2. Concrete, cl. A	400.9 c. y.	19.60	24.00	28.00
3. Reinforcing steel	230,835 lb.	.045	.045	.0425
4. Structural steel	149,754 lb.	.081	.075	.07
5. Precast conc. piles, 14 in	1,760 l. f.	2.50	2.75	2.90
6. Precast conc. piles, 16 in	400 l. f.	3.15	3.75	3.50
7. Untreated timber piles	1,320 l. f.	.82	.60	.35
8. Remove old bridge	1 ea.	1,500.00	900.00	800.00
9. Structural excav	440 c. y.	6.00	7.00	10.00
10. Seal course concrete, cl. A	67.28 c. y.	14.30	24.00	20.00
11. Piles, jetting piles	86 ea.	4.00	3 00	1.00
12. Load concrete test piles	6 ea.	100.00	50.00	75.00
13. Unload 30-ft conc. test piles	4 ea.	100 00	150.00	150.00
14. Unload 40-ft. timber test piles	2 ea	30.00	100.00	40.00

CONCRETE BRIDGE, CALIF.

OWNER: State Dept. Public Works; C. H. Purcell, Engineer, Sacramento, Calif.

PROJECT: Construction of a reinforced concrete girder overhead crossing over the tracks of the Southern Pacific R.R. and Western Pacific R.R. at Greenville, Calif., consisting of one 50.5-ft. span, eight 49-ft. spans, and one 16-ft. cantilever.

BIDS: Six bids were opened in September, 1937, ranging from the contract low of $104,209 to $117,239, with minimum hourly wage rates stipulated of $1.00 for skilled and 75c. for common labor.

LOW BIDDERS:

1. A. J. Raisch, San Jose, Calif. (contract)	$104,209
2. R. R. Bishop, Long Beach, Calif	108,690
3. C. N. Swenson, San Jose, Calif	109,196

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Structure excava	2,400 c. y.	$2.40	$1.50	$2.15
2. Reinf. steel	688,000 lb.	.052	.051	.055
3. Concrete, cl. A, struct	2,635 c. y.	21.00	23.00	22.27
4. Concrete, cl. A, railing	50 c. y	60.00	50.00	50.00
5. Misc. steel	8,000 lb.	.12	.15	.15
6. Corr. metal pipe, 8 in	285 l. f.	1.10	1.50	1.87
7. Corr. metal pipe, 10 in	120 l. f.	1.25	2.00	2.10
8. Corr. metal pipe, 18 in	75 l. f.	2.00	3.00	2.81
9 Corr. metal pipe, 24 in	75 l. f.	3.00	5.00	3.59
10. Spillway assemblies	2 each	20.00	15.00	25.00
11. Misc. items	L.S.	2,500.00	4,400.00	2,500.00

UNDERPASS, COLO.

OWNER: Colorado State Highway Dept.; Chas. Vail, chief engineer.

PROJECT: Construction of railroad underpass on East 46th Ave. between Humboldt St. and Platte River, Denver, 0.32 mi. in overall length, 15 ft. vertical clearance, 44 ft. lateral.

BIDS: Seven bids were opened and contract awarded in October, 1937, with totals ranging from $253,401 to $342,712, based on 250 days completion and minimum hourly wage rates of $1.25 for skilled and 62½c. for common labor.

LOW BIDDERS:

1. Dutton, Kendall & Hunt, Inc., Denver (contract)	$230,364
2. A. S. Horner, Denver	246,973
3. Thom. Bate & Sons, Denver	261,502

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clear, grub	L. S.	$50.00	$100.00	$100.00
2. Remove sewer pipe	135 l. f	1.75	1.00	2.00
3. Replace riprap, 0+32	L. S.	41.50	35.00	50.00
4. Replace riprap, 0+08	L. S.	87.50	45.00	100.00
5. Excav. unclass	19,000 c. y.	.53	.65	.45
6. Select backfill	600 c. y.	.75	1.00	1.24
7. Conc. base course	9,350 s. y.	1.17	1.25	1.24
8. Sand cushion	755 c. y.	.75	1.20	1.00
9. Conc. header crub	170 l. f.	.30	.30	1.00
10. Coarse bit. conc. pave	9,340 s. y	1.87	1.60	1.70
11. Asphalt plank surface	9,375 s. f.	.35	.32	.30
12. Conc. Cl. A	1,524 c. y.	13.60	16.00	15.75
13. Conc. Cl. B	4 c. y.	13.60	20.00	15.75
14. Conc. Cl. E	2,288 c. y.	14.40	15.50	16.40
15. Reinf. steel	244,700 lb.	.0494	.052	.049
16. Structural steel	1,043,300 lb.	.047	.053	.055
17. Struct. wrought iron	143,000 lb.	.076	.069	.08
18. Reinf. conc. pipe, 24-in	410 l. f.	8.19	6.00	11.50
19. Perf. c.m.p. underdrain	1,247 l. f.	2.50	1.60	2.60
20. Concrete gutter	280 l. f.	.80	.75	.75
21. Conc. comb. curb, gutter	3,510 l. f.	1.05	1.10	1.20
22. Gas tar waterproofing	1,205 s. y.	.30	.40	.12
23. Membrane waterproofing	1,280 s. y	1.23	1.40	5.00
24. Bronze name plate	2 ea.	25.00	25.00	25.00
25. Sheet copper	269 lb.	.45	.60	.46
26. Conc. sidewalk	6,970 s. f	.14	.16	.20
27. C. I. drain pipe, 6-in	106 l. f	1.75	2.00	.50
28. Elect. conduit, 1½-in	1,593 l. f.	.59	.60	.70
29. Pipe rail, posts	301 l. f.	2.34	2.50	2.20
30. Pipe rail, posts	144 l. f	2.34	2.50	2.20
31. Elect. light, standard	8 ea.	153.00	160.00	200.00
32. Elect. light, suspen. type	6 ea.	21.00	25.00	33.00
33. Elect. light, reflect. type	4 ea.	6.00	8.00	6.00
34. Spec. inlet, No. 12	3 ea.	10.00	80.00	30.00
35. Spec. inlet, No. 13	2 ea.	18.00	60.00	30.00
36. Spec. inlet, double, No. 12	2 ea.	25.00	110.00	45.00
37. Manhole	5 ea.	62.50	80.00	70.00
38. Drop manhole	3 ea.	77.00	90.00	90.00
39. Delgany manhole	2 ea.	96.50	100.00	100.00
40. Manhole, R & C, 24-in	1 ea.	9.75	12.00	10.00
41. Inlet connection, 12-in	377 l. f.	1.46	1.50	1.40
42. Vit. clay pipe sew., 18-in.	985 l. f.	2.63	2.70	2.30
43. Vit. clay pipe sew., 21-in.	630 l. f.	3.98	3.50	3.50
44. Vit. clay pipe sew., 24-in.	190 l. f.	3.80	4.00	3.65
45. Vit. clay pipe d.s., 24-in.	442 l. f.	3.92	4.00	3.70
46. Std. galv. pipe, 3-in	158 l. f	0.57	1.50	.50
47. Deck drain system	L. S.	1,630.00	1,800.00	1,500.00
48. Auto drain gate, 18-in	1 ea.	18.80	25.00	20.00
49. Auto drain gate, 24-in	1 ea.	24.85	30.00	28.00
50. Sheet zinc	1,390 lb.	.35	.33	.30
51. Brick sewer, 78-in	1,231 l. f.	24.57	28.00	32.00
52. Pumping unit	L. S.	2,925.00	2,900 00	3,700 00
53. Door, 3x7 ft	1 ea.	15.00	25 00	18.00
54. Steel windows	3 ea.	8.06	15.00	22.00

VIADUCT FOUNDATION, N. J.

OWNER: Port of New York Authority; J. C. Evans, Chief Engr.

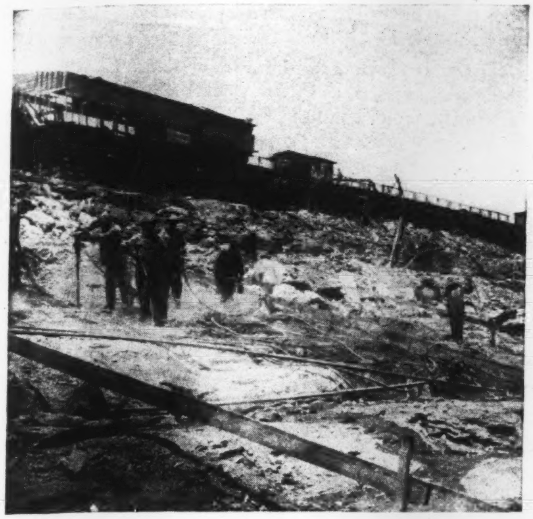
PROJECT: Excavation and foundations for concrete and steel viaduct sections for Lincoln tunnel approach in Weehawken, N. J.

BIDS: Six bids were opened in November, 1937, ranging from a low of $217,615 to $380,280, based on prevailing minimum wage rates.

LOW BIDDERS:

1. L. P. O'Connor, Inc., New York	$217.615
2. P. J. Carlin Const. Co., Inc., New York	242,440
3. Linn Ave. Const. Co., Corona, N. Y.	253,083

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Conc. cyl. found., 6 ft	325 l. f.	$80.00	$90.00	$85.80
2. Conc. cyl. found., 6½ ft	320 l. f.	88.00	100.00	99.00
3. Conc. cyl. found., 7 ft	210 l. f.	96.00	110.00	110.00
4. Conc. cyl. found., 8 ft	135 l. f.	115.00	140.00	137.50
5. Sheeted conc. found	1,050 c. y.	53.00	54.00	66.00
6. Excavation	6,000 c. y.	7.00	7.00	7.70
7. Portland cement	5,000 bbl.	2.75	3.00	2.75
8 Concrete	650 c. y.	13.00	25.00	16.50
9. reinf. steel	132,000 lb.	.06	.07	.09



Condor Air Hose in use at Norris Dam. Over 10,000 feet of Condor Air and Water Hose was used in the construction of Norris and Wheeler Dams.

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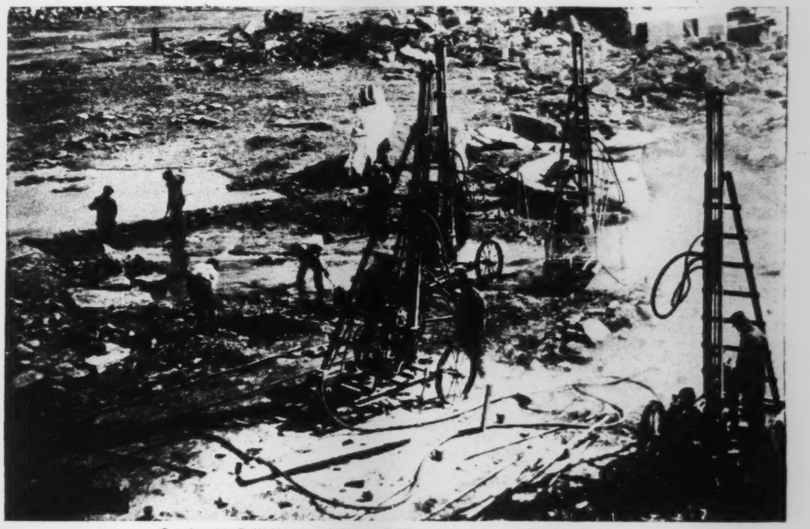
- Water Hose
- Oil and Gasoline Hose
- Chute Lining
- Launder Lining
- Industrial Brake Blocks and Lining
- Molded Rubber Goods
- Rubber Lined Tanks
- Rubber Covered Rolls

Abrasive Wheels—Rubber Bonded



Condor Air Drill Hose on Wagon Drills at large Hydro-Electric Project.

THE MANHATTAN RUBBER MFG. DIVISION

OF RAYBESTOS-MANHATTAN, INC.

EXECUTIVE OFFICES AND FACTORIES, 4 TOWNSEND ST., PASSAIC, N. J.

GRADE CROSSING, MAINE

OWNER: State Highway Commission; L. D. Barrows, Chief Engineer, Augusta, Me.

PROJECT: Construction of 376 ft. crossing 18 ft. above B&M.RR. 3½ miles from Biddeford on Route 1. Structure and approaches total 1970 ft. overall, the former comprising a 6 span continuous I-beam bridge with 2 roadway lanes 22 ft. each, and 2-3 ft. sidewalks.

BIDS: Opened June 2, 1937. Six were received on the structural steel portion and 12 on the concrete with the former ranging from a low of $42,800 to a high of $50,720 and the latter from $139,215 to $229,902.

CONDITIONS: Contract is scheduled for completion in 180 days with minimum wage rates stipulated of 40c. per hr. for common and 80c. for skilled labor. Borings indicate 10 ft. firm clay overlying muck to ledge and due to 35 ft. fill a relief ditch will be dug through the clay and into the muck at toe of slope to relieve fill pressure and allow muck displacement. All materials and labor other than for steel field painting to be furnished by contractor.

LOW BIDDERS: (Structural steel)

1. American Bridge Co. Boston, Mass.	$42,800
2. Bethlehem Steel Co. Bethlehem, Pa.	43,280
3. Harris Struct. Steel Co. New York, N. Y.	48,800

(Concrete and earthwork)

1. Concrete Const. Co. & Cerulli Const. Co. Chelsea, Mass.	$139,215
2. Dominic M. Bernardi, Wellesley, Mass.	140,547
3. Wyman & Simpson Inc. Augusta, Me.	147,127

Item	Quan.	Unit Prices (1)	(2)	(3)
CONCRETE AND EARTHWORK				
1. Maintain traffic	l. s.	$2,000.00	$1,000.00	$4,650.00
2. Channel diversion	150 c. y.	.60	1.00	1.00
3. Cofferdams	l. s.	700.00	800.00	240.00
4. Piles, round wooden	2,000 l. f.	.71	.50	.60
5. Concrete in abutments	230 c. y.	7.75	14.00	10.00
6. Concrete in piers	440 c. y.	8.80	14.00	12.00
7. Conc. roadway, s. w. slabs	1,210 c. y.	18.64	14.00	19.50
8. Conc. wearing surface	170 c. y.	12.40	10.00	7.00
9. Concrete rail	754 l. f.	3.26	2.00	3.00
10. Cement	3,700 bbl.	2.50	2.56	2.70
11. Reinf. steel, furnish	264,000 lb.	.0543	.035	.04
12. Reinf. steel, set	264,000 lb.	.014	.0075	.01
13. Backfill	350 c. y.	.50	.60	1.00
14. Fill in approaches	115,000 c. y.	.30	.39	.35
15. Gravel base	3,500 c. y.	.75	.50	.70
16. Gravel surfacing	700 c. y.	1.00	.60	1.30
17. Bit. macad. surfacing	570 c. y.	5.00	4.60	5.50
18. Guard rail	2,250 l. f.	.60	.38	.46
19. Anchorages, bridge	4 ea.	15.00	12.00	20.00
20. Anchorages, outside	4 ea.	15.00	9.00	10.00
21. Building tile	1,000 c. f.	.71	.32	1.00
22. Steel hangers	6,500 lb.	.11	.14	.13
23. Wire mesh	32,000 s. f.	.067	.05	.04
24. Cast iron drains	8 ea.	50.00	45.00	20.00
25. Steel piles, 53 lb	2,800 l. f.	2.20	2.10	2.10
26. Steel piles, 42 lb.	2,800 l. f.	1.75	1.70	1.75
27. Steel pile caps	9,200 lb.	.036	.115	.06
28. Concrete culvert	260 c. y.	9.08	8.00	13.00
29. Loam	1,600 c. y.	1.00	1.00	1.50
30. Sodding	1,200 s. y.	1.10	.60	.60
31. Timber drains, chutes	9 M.b.m.	124.30	80.00	50.00
32. Excav. relief ditches	6,000 c. y.	.60	1.15	.40
33. Remove conc. driveway	270 c. y.	1.00	7.00	4.50
34. Cobble gutter	400 s. y.	2.00	2.00	2.00
35. Conc. culvert headwalls	4 c. y.	5.75	18.00	20.00
36. Remove top slab, culvert	L. S.	50.00	100.00	60.00
37. Excav. structures	1,000 c. y.	.50	1.25	1.00
38. Excav. pipe culv. struct.	300 c. y.	.50	1.25	1.50
39. Seeding	115 M.s.f.	4.00	5.00	6.00
40. Fill relief ditch	4,000 c. y.	.50	.50	.85
41. Emulsified asphalt	20,000 gal.	.14	.12	.15
42. Reinf. conc. pipe, 18 in	72 l. f.	3.00	3.00	2.20
STRUCTURAL STEEL				
43. Struct. steel, riveted	800,000 lb.	.043	.0441	.0445
44. Erection, struct. steel	800,000 lb.	.01	.01	.0165

SNAKE RIVER BRIDGE

OWNER: State of Washington and State of Idaho, L. V. Murrow, Director of Highways for Washington, and I. J. Taylor, Commissioner of Public Works for Idaho.

PROJECT: Construction of a steel vertical lift bridge flanked by steel truss spans and with reinforced concrete approach spans over Snake River, and reinforced concrete paving of Washington State Highway No. 3 and Idaho State Highway No. 9, between Lewiston, Idaho, and Clarkston, Wash. The main span is a 200-ft. steel lift with 30-ft. of vertical movement. Total length is 1,423 ft.; roadway is 40 ft. wide with one 5-ft. sidewalk. Trusses flanking lift span are 150 ft. and remaining spans (14) are reinforced concrete T-beam continuous spans. Project also includes 1,008 ft. of connecting concrete highways.

CONDITIONS: Completion is scheduled for 540 calendar days. Rail and highway facilities are available at the site. Six piers on the Washington side at the center of the channel will be on spread footings, and twelve piers on the Idaho side will be on piles. All timber is to be Douglas fir, and all timber in pier protection is to be creosote treated. Employment is limited to 40 hours per week per individual and the following minimum wage scale: skilled labor, $1.20 per hour; intermediate, $0.75; unskilled, $0.50.

BIDS: Five bids were opened March 1, 1938, ranging from the contract low of $748,337 to $926,516.

LOW BIDDERS:

1. Puget Const. Co., Seattle, Wash. (contract)	$748.337
2. The Gilpin Const. Co., Portland, Ore.	765.637
3. Parker Schram Co., Portland, Ore.	796.817

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clear, grub	L. S.	$1,000	$1,000	$100
2. Unclass. excav	36,860 c. y.	.50	.50	.45
3. Struct. excav	790 c. y.	1.50	1.25	1.50
4. Finish roadway	10 sta.	10.00	15.00	25.00
5. Gravel surfacing	80 c. y.	1.00	3.00	1.00
6. Conc. pave., std	6,410 s. y.	2.50	2.30	2.50
7. Conc. pave., h. e. s.	937 s. y.	3.00	2.40	2.75
8. Bridge appr. slab, std.	44 c. y	20.00	12.00	13.00
9. Bridge appr. slab, h.e.s.	30 c. y.	25.00	13.00	14.00
10. Header No. 3	449 l. f.	1.00	.60	.50
11. Header No. 4	120 l. f.	1.00	.75	.85
12. Reinf	34,790 lb.	.06	.06	.05
13. Dowel bars, rubber caps	2,116 ea.	.25	.33	.25
14. Dowel bars, no caps	2,946 ea.	.20	.25	.15
15. Integ. conc. curb	2,231 l. f	.40	.30	.25
16. Conc. driveway	197 s. y.	2.50	2.50	2.50
17. Conc. sidewalk	992 s. y.	1.50	1.30	1.80
18. Conc. walk, integ. beams	35 s. y.	2.00	3.00	3.00
19. Curb guard	296 l. f.	.70	.80	.80
20. Sack riprap	370 c. y.	12.50	18.00	14.25
21. Conc. catch basin	5 ea.	50.00	50.00	60.00
22. Spl. catch basin	3 ea.	50.00	75.00	45.00
23. Spl. curb inlet	9 ea.	20.00	50.00	20.00
24. Std. manhole	4 ea.	75.00	100.00	95.00
25. Conc. markers	4 ea.	4.00	10.00	8.00
26. Reconstruct manhole.	L. S.	20.00	25.00	15.00
27. Remove bit. pave	456 s. y.	.25	.50	.50
28. Remove conc. curb	193 l. f.	.10	.20	.10
29. Remove conc. sidewalk	504 s. y.	.20	.30	.35
30. Cor. iron pipe 8-in	138 l. f.	1.00	1.00	.80
31. Cor. iron pipe 12-in	48 l. f.	1.50	1.50	1.15
32. C. sewer pipe 6-in	333 l. f.	.40	.50	.45
33. C. sewer pipe 8-in	552 l. f.	.60	.70	.60
34. C. sewer pipe 12-in	216 l. f.	1.00	1.25	1.10
BRIDGE				
35. Excav	8,000 c. y.	7.00	7.00	10.00
36. Gravel backfill	110 c. y.	3.00	3.00	3.25
37. Conc. class A	5,080 c. y.	24.00	28.00	22.50
38. Conc. class B	1,720 c. y.	22.00	22.00	21.55
39. Conc. class B (counterweight)	320 c. y.	15.00	22.00	25.60
40. Conc. class D	2,220 c. y.	21.00	15.00	12.35
41. Furn. and drive test piles	4 ea.	240.00	400.00	500.00
42. Furn. steel found. piling	19,500 l. f.	2.00	2.20	2.25
43. Drive and cap steel piles	491 ea.	15.00	15.00	10.50
44. Splice piles	50 ea.	10.00	10.00	6.50
45. Timber	30 M.b.m.	100.00	130.00	165.00
46. Reinf	1,350,000 lb.	.05	.05	.05
47. S. carbon steel	1,450,000 lb.	.07	.08	.09
48. S. silicon steel	440,000 lb.	.08	.085	.10
49. Cast steel	157,000 lb.	.30	.20	.24
50. Copper seals	285 lb.	.60	1.00	1.00
51. Cast steel drains	44 ea.	27.50	25.00	33.50
52. Conc. bridge railing	1,830 l. f.	2.00	3.50	4.50
53. Wire rope and fittings.	L. S.	8,500.00	10,000.00	8,500.00
54. Machinery	93,000 lb.	.30	.40	.37
55. Roller bearings	L. S.	18,000.00	18,000.00	19,500.00
56. Mech. and elec. equip.	L. S.	31,000.00	28,000.00	33,500.00
57. Operator's house	L. S.	5,500.00	6,500.00	7,000.00
58. Machinery house	2 ea.	3,950.00	4,000.00	4,675.00
59. Traffic barriers	2 ea.	5,000.00	5,500.00	6,250.00
60. Reflector units	2 ea.	5.00	10.00	6.50
61. Abutment lights	L. S.	1,000.00	1,000.00	1,000.00
62. Removing struct	L. S.	11,000.00	100.00	5,000.00

UNIT BID PRICES—BRIDGES

UNDERPASS, CALIF.

OWNER: California State Highway Dept., Sacramento.

PROJECT: Construction of undergrade crossing under S.P.RR. at Livingston, Calif., consisting of steel girder track span on concrete abutments, and 1.9 mi. concrete approaches.

BIDS: Seventeen bids were opened in November, 1937, ranging from a low of $215,872 to a high of $274,429, with minimum hourly wages stipulated of $1.00 for skilled and 60c. for common labor.

LOW BIDDERS:

1. Louis Biasotti & Son, Stockton, Calif. (contract)	$215,872
2. J. F. Knapp, Oakland, Calif.	233,820
3. E. W. Heple, San Jose, Calif.	234,083

Item	Quan.	Unit Prices		
		(1)	(2)	(3)
1. Clear, grub	101 sta.	$10.00	$3.00	$10.00
2. Water	560 m. g.	1.75	1.00	1.50
3. Roadway excav	57,000 c. y.	.30	.30	.40
4. Structure excav	2,200 c. y.	1.50	1.75	1.50
5. Overhaul	750,000 sta.yd.	.005	.005	.005
6. Prepare subgrade	26,500 s. y.	.09	.10	.10
7. Finish roadway	101 sta.	4.00	6.00	5.00
8. Salvage surface	350 c. y.	.60	1.00	1.00
9. Gravel, stone surf	4,400 ton	2.50	2.50	2.50
10. Liquid asphalt, MC–2	11 ton	19.00	25.00	15.00
11. Asphalt emulsion, seal	8 ton	25.00	22.00	25.00
12. Liquid asphalt, MC–5, extra	90 ton	19.00	16.00	17.00
13. Asphalt paint binder	300 s. y	.05	.10	.15
14. Mineral aggregate	1,800 ton	3.50	3.50	5.00
15. Screenings, seal coat	85 ton	3.00	3.00	3.00
16. Liquid asphalt, SC–2	25 ton	14.00	20.00	16.00
17. Pavement conc., cl. B	380 c. y	8.00	9.00	8.25
18. Structure conc., cl. A	1,210 c. y.	14.25	18.00	15.50
19. Pave., conc. thick, cl. B	1,525 c. y.	7.00	9.00	8.25
20. Conc., cl. A, curbs, walks	1,115 c. y.	11.00	18.00	14.00
21. Conc., cl. A, slope paving	625 c. y.	13.50	12.00	16.00
22. Remove concrete	540 c. y.	2.00	2.00	2.00
23. Reinf. steel	225,000 lb.	.053	.055	.055
24. Pavement dowels	9,700 ea.	.22	.20	.24
25. Pave. tie bolts	2,600 ea.	.40	.50	.40
26. Structural steel	216,000 lb.	.09	.085	.09
27. Cast steel, rockers, bearings	9,186 lb.	.20	.15	.20
28. Wrought iron plate	50,000 lb.	.095	.09	.095
29. Misc. iron, steel	8,000 lb	.20	.18	.20
30. Copper strips	4,900 lb.	.35	.25	.50
31. Furnish treated fir piles	2,520 l. f	.75	.70	.75
32. Furnish plain fir piles	10,395 l. f.	.25	.30	.35
33. Drive piles	287 ea.	20.00	10.00	12.00
34. Corr. metal pipe, 8-in	810 l. f.	1.10	1.10	.90
35. Corr. metal pipe, 10-in	480 l. f.	1.20	1.25	1.15
36. Corr. metal siphon, 18-in	46 l. f.	2.45	2.75	2.75
37. Concrete joint, 18-in	1 ea.	15.00	10.00	12.00
38. Perf. metal underdrain, 6-in	100 l. f.	.85	.75	.65
39. Perf. metal underdrain, 8-in	94 l. f.	1.00	1.10	.80
40. Perf. metal underdrain, 12-in	3,680 l. f.	1.30	1.25	1.40
41. Rock fill, underdrains	750 c. y.	2.80	3.00	2.50
42. Concrete pipe, 8-in	30 l. f.	.67	.50	.50
43. Concrete pipe, 12-in	464 l. f.	1.00	.75	.65
44. Concrete pipe, 15-in	250 l. f.	1.30	1.00	.90
45. Concrete pipe, 18-in	110 l. f.	1.60	1.25	1.10
46. Welded steel pipe, 14-in	300 l. f.	2.50	2.50	2.70
47. New property fence	2.6 mile	500.00	500.00	500.00
48. Drive gates	9 ea.	20.00	20.00	20.00
49. Monuments	27 ea.	3.00	3.00	3.00
50. Traffic lane crossing devices, type A-12	4 ea.	35.00	70.00	55.00
51. Same, type B-12	8 ea.	30.00	50.00	40.00
52. Guide posts	13 ea.	3.00	2.50	3.00
53. Protective covering	16 c. y.	7.00	25.00	30.00
54. Pumping equipment	L. S.	3,500.00	3,500.00	3,200.00
55. Electrical equipment	L. S.	2,300.00	2,000.00	2,200.00
56. Misc. items	L. S.	1,000.00	3,500.00	1,000.00

BRIDGE AND OVERPASS, OKLA.

OWNER: Oklahoma State Highway Dept., V. T. Moon, Chief Engineer.

PROJECT: Combined bridge over South Canadian River and overpass across A. T. & S.F.R.R., Purcell, Okla. Project consists of 33 deck truss spans 100 ft. long, one 200-ft. deck truss span, two 50-ft. I-beam spans, all on concrete piers; total length of project 3,672 ft. Carries 32-ft. roadway and two 3-ft. sidewalks. Bridge is federal aid project; overpass, 509 ft. long near one end is WPGM project. For accounting purposes separate bids were asked for on each part of project; for most part contractors bid same unit prices on each.

BIDS: Nine bids were received in May, 1937, based on six alternate designs. Lowest was for Design No. 2, $651,781; highest for this design was $712,931. Highest of all was Design No. 4; top bid was $770,856. Rock excavation is a separate bid unit; all other excavation, sheeting and shoring is included in the price bid for foundation concrete.

CONDITIONS: Quicksand in river expected to give trouble in foundations of river bridge. Existing bridge will be kept in service for traffic. Completion scheduled for eight months. Minimum wage rates specified: Skilled, $1.00; semi-skilled, 75c.; common, 40c. Material haul will be about one mile.

LOW BIDDERS: (Three low for Design No. 2 only).

1. Guy H. James, Oklahoma City, Okla. (contract).	$651,781
2. Kelliher Const. Co., Dallas, Tex.	654,236
3. Leo Saunders, Oklahoma City	657,468

Item	Quan	Unit Prices		
		(1)	(2)	(3)
1. Rock excav.— Overpass	256 c. y.	$10.00	$5.50	$12.00
Bridge	1,825 c. y.	10.00	8.00	12.00
2. Concrete piles	930 l. f.	3.00	3.50	3.50
3. Concrete, fdns. of abut. and piers — Overpass	614 c. y.	27.00	27.90	35.75
Concrete, fnds. of abut. and piers — Bridge	5,676 c. y.	27.00	27.20	35.75
4. Concrete, abut. and pier shafts	3,117 c. y.	17.00	17.50	12.50
5. Concrete, deck slab	4,049 c. y.	15.00	16.96	15.50
6. Reinforcing steel	1,104,690 lb.	.047	.0522	.0425
7. Structural steel, carbon	3,063,100 lb.	.061	.05925	.05
8. Struct. steel, manganese	1,105,500 lb.	.072	.06325	.0683
9. Lead bearing plates	3,720 lb.	.15	.15	.11
10. Hand rail	7,346 l. f.	3.50	4.16	3.50

Note: Except for Items 1 and 3, all quantities are for combined bridge and overpass for which unit prices are identical.

RAILROAD VIADUCT, SAN FRANCISCO

OWNER: Dept. Public Works, California; C. H. Purcell, Chief Engineer.

PROJECT: Construction of concrete railroad viaduct in connection with the San Francisco-Oakland Bridge, California.

BIDS: Six bids were opened in August, 1937, ranging from $605,350 to $733,337, with the contractor furnishing all materials and labor, and minimum hourly wages stipulated of $1.66 for skilled and 75c. for common labor.

LOW BIDDERS:

1. Eaton & Smith, San Francisco, Cal.	$605,350
2. Bates & Rogers, Const. Co., Oakland, Cal.	651,607
3. Clinton Const. Co., San Francisco, Cal.	670,854

Item	Quan.	Unit Prices		
		(1)	(2)	(3)
1. Demolition, buildings	L. S.	$2,600.00	$3,700.00	$5,900.00
2. Excavation unclass	20,000 c. y.	1.18	.50	.53
3. Excav. struct	15,000 c. y.	2.36	2.80	3.80
4. Cut piles	50 ea.	4.00	7.00	2.00
5. Timber piles	45,000 l. f.	.73	.615	.58
6. Concrete piles	10,000 l. f.	3.12	2.65	2.75
7. Concrete, foundations	4,500 c. y.	7.50	10.00	9.40
8. Concrete, superstruc	12,500 c. y.	15.30	19.85	20.00
9. Extra Portland cement	2,500 bbl.	2.32	1.95	2.00
10. Conc. deck, steel spans	1,400 c. y.	21.80	21.45	20.00
11. Reinforcing steel	3,300,000 lb.	.05	.0458	.049
12. Misc. steel work	100,000 lb.	.10	.185	.09
13. Bronze exp. plates	4,200 lb.	.50	.51	.37
14. Pipe railing	100,000 lb.	.17	.168	.175
15. Waterproof deck	L. S.	7,600.00	6,470.00	7,000.00
16. Drainage	L. S.	12,080.00	14,400.00	17,300.00
17. Street work	L. S.	4,400.00	3,800.00	4,300.00

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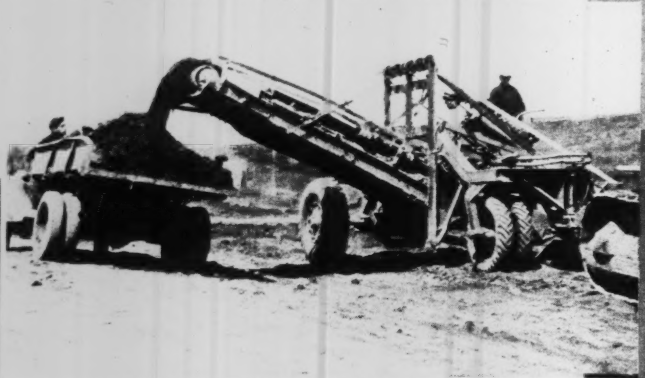

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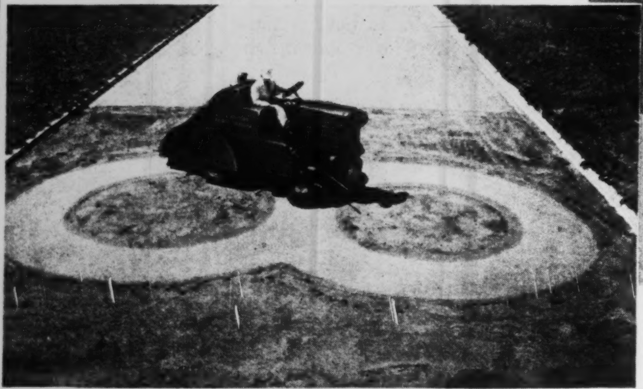

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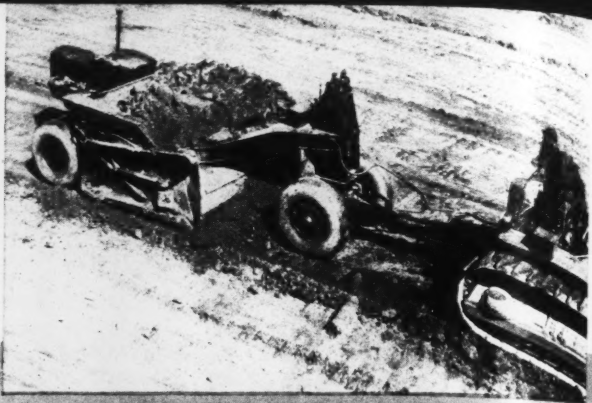

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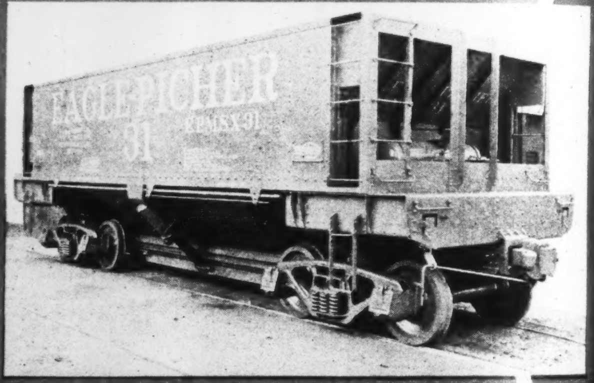

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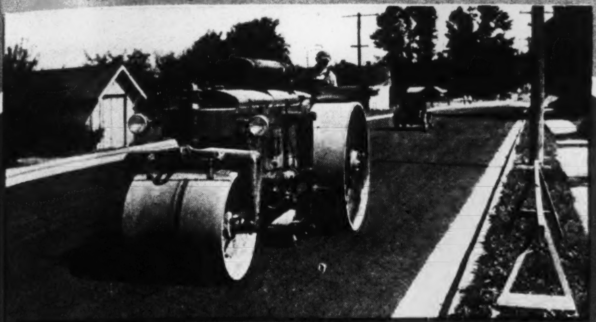

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UNIT BID PRICES—BRIDGES

HIGHWAY BRIDGE, S. C.

OWNER: State Highway Dept., Columbia, S. C.; W. J. Gooding, Engineer.

PROJECT: Construction of 987 ft. combination swing bridge over Battery Creek on Beaufort-Parris Island Road, Beaufort County, S. C. Contracts are in two sections: (1) substructure and 40-ft. superstructures; (2) 75-ft. continuous superstructures and 245 ft. swing span with machinery and electrical equipment.

BIDS: Nine bids were opened in December, 1937, for the work on the substructure portion, ranging from a low of $90,426 to a high of $117,569; and seven on the superstructure, ranging from $89,254 to $100,491. Minimum hourly wage rates are stipulated at 55c. for skilled and 25c. for common labor with completion scheduled at 220 days for the substructure and approximately 325 days for the superstructure from commencement of foundation operations. Tabulation shows low bid only.

LOW BIDS:

SUBSTRUCTURE

1. R. H. Blackwell, Jacksonville, Fla.	$90,426
2. Tidewater Const. Co., Norfolk, Va.	91,845
3. Clement Const. Co., Charleston, S. C.	97,206

SUPERSTRUCTURE

1. Vincennes Steel Corp., Vincennes, Ind.	$89,254
2. Virginia Bridge Co., Atlanta, Ga.	90,900
3. Hardaway Const. Co., Greenwood, S. C.	91,686

SUBSTRUCTURE

Item	Quan.	Unit Prices (1)
1. Wet excavation	500 c. y.	$15.00
2. Concrete, cl. AA	894.7 c. y.	26.00
3. Concrete seals, cl. AA	741.4 c. y.	26.00
4. Reinforcing steel	109,009 lb.	.05
5. Creosoted timber piles	6,810 l. f.	1.10
6. Precast concrete piles	2,820 l. f.	5.00
7. Creosoted struct. timber	38.18 M.b.m.	140.00
8. Steel superstructures, 40 ft	L. S.	8,000.00

SUPERSTRUCTURES

Item	Quan.	Unit Prices (1)
1. Concrete, cl. AA	304.48 c. y.	25.00
2. Reinforcing steel	71,049 lb.	.044
3, Swing span steel	L. S.	27,284.00
4. Steel, spans BB and D	9 L. S.	16,232.00
5. Control and light plant houses	L. S.	1,500.00
6. Machinery, electrical equipment	L. S.	33,500.00

CONNECTICUT RIVER BRIDGE, MASSACHUSETTS

OWNER: Dept. Public Work, Commonwealth of Massachusetts; Geo. H. Delano, chief engineer; Geo. E. Harkness, bridge engineer.

PROJECT: Five span steel deck truss, concrete roadway, 1980 ft. overall length, 30 ft. in width, with 6-ft. sidewalks, over the Connecticut River between the townships of Gill and Montague at Turners Falls, Mass. The deck is 40 ft. above mean high water, with the bottom chord 8 ft. above 1936 flood level.

BIDS: Opened March 16, 1937. Eight proposals submitted with price range from contract low of $860,568 to $974,885. Awarded low bidder on May 10, 1937.

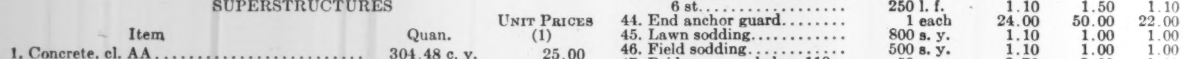
CONDITIONS: Proposed bridge site is below dam, with very little water to affect construction progress. The site is accessible by highway and railroad. Completion scheduled for June 4, 1938 with minimum hourly wag stipulated at $1.20 for skilled, 75 c. for semi-skilled, a 50 c. for common labor.

MATERIALS FURNISHED: All items required in t construction are to be furnished by the general contracto

LOW BIDDERS:

1. Daniel O'Connell's Sons, Holyoke, Mass.	$860,56
2. Carlo Bianci & Co., Framingham, Mass.	864,4
3. Chas. I. Hosmer, Greenfield, Mass.	865,1

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Road ledge excav.	800 c. y.	$2.00	$2.50	$2.50
2. Borrow	1,300 c. y.	.60	.50	.50
3. Concrete, Cl. D	8 c. y.	22.00	20.00	20.00
4. Concrete, Cl. C	4,270 c. y.	9.80	14.00	13.00
5. Roadway stone	400 c. y.	3.60	3.50	3.00
6. Vit. pipe, 10 in.	394 l. f.	.50	.50	.60
7. Vit. pipe, 12 in.	290 l. f.	.60	.60	.70
8. Reinf. conc. pipe, 24 in.	118 l. f.	3.00	3.50	3.25
9. CIW. pipe, 8 in.	74 l. f.	1.93	1.25	2.50
10. CIC pipe, hvy., 12 in.	56 l. f.	2.44	2.25	2.20
11. Bounds	16 each	7.30	6.00	6.00
12. Catch basins	10 each	67.00	70.00	70.00
13. Curb inlets, granite	6 each	17.00	20.00	16.00
14. Remove trees	8 each	20.00	20.00	5.00
15. Gravel borrow	3,100 c. y.	.91	.70	.70
16. Sand borrow	100 c. y.	1.80	1.50	1.50
17. Strip gravel pits	310 c. y.	.12	.20	.20
18. Concrete, Cl. B	96 c. y.	61.00	60.00	60.00
19. Concrete, Cl. A	4,975 c. y.	16.60	16.50	16.00
20. Granite curbs, 6 x 18 in.	675 l. f.	1.46	1.50	1.35
21. Manholes	8 each	67.00	70.00	70.00
22. Lumber sheeting	2 M.b.m.	91.00	80.00	20.00
23. Grade, roll, finish	5,000 s. y.	.09	.05	.03
24. Steel reinforcing	1,055,000 lb.	.045	.04	.049
25. Bitum. waterpfg	6,706 s. y.	.24	.25	.30
26. Cable rail, remove, reset	110 l. f.	.30	.60	.30
27. Curb, remove, reset	140 l. f.	.60	.50	.80
28. Granolithic walks	40 s. y.	2.25	3.00	3.00
29. Cobble gutter, remove, reset	20 s. y.	1.20	1.50	1.00
30. Reset stone, cmt. mortar	5 c. y.	12.00	15.00	12.00
31. Trench excavation	550 c. y.	1.83	1.25	1.20
32. Clear, grub	0.6 ac.	200.00	150.00	240.00
33. Adjust manholes, etc	1 each	18.00	25.00	10.00
34. Trench ledge excav.	550 c. y.	1.83	1.25	1.20
35. Curv. granite curb, 6 x 18 in	565 l. f.	1.95	2.25	1.75
36. Granite curb corners	2 each	8.00	20.00	10.00
37. Curb corner, remove, reset.	1 each	6.00	3.00	5.00
38. Curv. gran. curb inlets	2 each	21.00	25.00	18.00
39. Catch basin frames, grates.	2 each	22.00	20.00	20.00
40. Traffic signal duct	370 l. f.	1.20	.70	.50
41. Pea stone, drives	10 ton	1.80	3.00	2.50
42. Cable guard rail	200 l. f.	.18	.20	.20
43. Cable rail, 2 str. steel, mult. 6 st.	250 l. f.	1.10	1.50	1.10
44. End anchor guard	1 each	24.00	50.00	22.00
45. Lawn sodding	800 s. y.	1.10	1.00	1.00
46. Field sodding	500 s. y.	1.10	1.00	1.00
47. Bridge excav. below 110	50 c. y.	2.70	3.00	1.00
48. Bridge excav. from 110 to 120	100 c. y.	2.70	2.50	2.00
49. Bridge excav. from 120 to 130	190 c. y.	2.70	2.00	2.00
50. Bridge excav. above 130	1,990 c. y.	2.70	2.50	4.00
51. Cofferdam	total	5,000.00	5,000.00	4,000.00
52. Concrete excavation	12 c. y.	50.00	7.00	20.00
53. Copper gutter	1,250 lb.	.60	.75	.60
54. Carbon steel	5,040,000 lb.	.072	.076	.074
55. Silicon steel	2,175,000 lb.	.0759	.077	.0775
56. Light iron work	25,000 lb.	.18	.20	.20
57. Welded steel fence	3,175 l. f.	6.50	7.00	7.00
58. Aluminum shields	500 lb.	.34	1.00	1.10
59. Remove fossil specimens	500 s. f.	.60	1.00	0.10
60. Quarry granite masonry	488 c. y.	58.00	50.00	49.00
61. Four cut granite masonry.	1,196 s. f.	4.50	4.00	4.50
62. Cap stones	376 s. f.	5.00	4.50	4.00
63. Conc. marker strips	1,100 l. f.	1.00	.30	.50
64. Scuppers	34 each	15.00	25.00	15.00
65. C. I. pipe, 6 in.	1,750 l. f.	1.50	1.50	1.50
66. Kalamein door, frame	1 each	256.00	250.00	100.00
67. Curb lamp posts	15 each	244.00	200.00	190.00
68. End post lamp standard	4 each	390.00	210.00	200.00
69. Korduct, 4 in.	13,632 l. f.	.37	.20	.20
70. W. I. pipe conduit, 4 in.	368 l. f.	1.35	1.50	1.50
71. Bronze sleeves, 5 in.	102 l. f.	3.90	4.00	3.50
72. Models, waste moulds	total	975.00	1,200.00	900.00
73. Bronze lanterns, curb stds.	15 each	318.00	175.00	170.00
74. Bronze lanterns, end posts.	4 each	390.00	265.00	250.00
75. Electrical equipment	total	5,150.00	4,500.00	4,000.00
76. Remove, alter bldgs	total	610.00	1,500.00	1,000.00
77. Bitum. conc. bridge surface	702 ton	10.65	8.50	9.50
78. Bitum. conc. sidewalk surface	10 ton	11.00	8.50	10.00
79. Macadam broken stone	310 c. y.	3.85	4.50	3.70
80. Bitum. asphalt surface	10,800 ga.	.14	.15	.13
81. Mac. sidewalk stone	10 c. y.	4.15	4.50	4.00
82. Bit. asphalt sidewalk surface	300 ga.	.16	.15	.20



Five-span deck truss bridge over Connecticut River, Turners Falls, Mass.

WATER SYSTEM, PORT EWEN, N. Y.

OWNER: Port Ewen Water District, Ulster County, N. Y.; Sanborn & Bogert, Consulting Engineers, New York City.

PROJECT: Construction of force main and distribution system for water supply in Port Ewen, N. Y., including 4 miles of 6-in., 3½ miles of 8-in., and 1¼ miles of 10-in., cast iron pipe, gate valves, hydrants and appurtenant construction, with specifications based on Leadite joints.

BIDS: Eleven bids were opened in November, 1937, ranging from a low of $96,180 to a high of $126,380, with an additional bid submitted by the low bidder providing for lead joints at 5c. per ft. more than for the Leadite specified.

LOW BIDS:

1. Bruno Trimpoli, Schenectady, N. Y.	$96,180
2. Castone Bros., Inc., Verona, N. Y.	96,660
3. W. G. Fritz Co., Inc., West Orange, N. J.	96,841

Item	Quan.	Unit Prices (1)	(2)	(3)
1 C. i. pipe, Cl. B., 6 in.	16,200 l. f.	$1.40	$1.30	$1.39
2. C. i. pipe, Cl. C., 6 in	5,000 l. f.	1.40	1.30	1.39
3. C. i. pipe, Cl. B., 8 in.	15,500 l. f.	1.81	1.70	1.76
4. C. i. pipe, Cl. C., 8 in.	1,800 l. f.	1.81	1.70	1.76
5. C. i. pipe, Cl. B., 10 in.	6,250 l. f.	2.33	2.27	2.16
6. C. i. pipe, Cl. C., 10 in.	50 l. f.	2.33	2.27	2.16
7. Gate valves, 6 in.	85 ea.	30.00	27.00	25.00
8. Gate valves, 8 in.	12 ea.	45.00	42.50	36.50
9. Gate valves, 10 in.	6 ea.	72.50	75.00	62.00
10. Hydrants	55 ea.	80.00	78.00	72.00
11. Valves boxes	103 ea.	4.00	6.20	4.00
12. Spec. castings	3 ton	130.00	150.00	140.00
13. Corp. cocks, etc	250 ea.	13.00	12.00	15.00
14. Road crossings, c. i. p.	5 ea.	75.00	200.00	200.00
15. Road crossings, services.	4 ea.	50.00	100.00	60.00
16. Excav. structures	300 c. y.	1.00	1.00	2.50
17. Concrete	40 c. y.	14.00	21.50	15.00
18. Rock excav	1,500 c. y.	3.00	4.50	3.00
19. Restore conc. curb, gutter.	1400 l. f.	.70	1.00	1.50
20. Restore conc. sidewalk.	1,000 s. y.	1.50	2.15	2.00
21. Timber, lumber	10 M.b.m.	10.00	45.00	35.00
22. Air valve, vault	3 ea.	25.00	115.00	100.00

SAN FRANCISCO PIPELINE

OWNER: San Francisco Public Utilities Commission; N. A. Eckhart, Chief Engineer.

PROJECT: Constructing 9,400 lin.ft. of 60-in. steel pipe as part of New Sunset Reservoir project located at Ortega, Pacheco, 24th and 28th Aves., San Francisco, Calif. Work includes the fabrication, lining and coating of steel pipe with and 153 lin.ft. of bell and spigot joints for fittings.

BIDS: Seven bids were opened in October, 1937, ranging from $214,820 to $242,035, with minimum hourly wages stipulated of $1.67 for skilled and 75c. for common labor.

LOW BIDDERS:

1. Williams Bros. and Haas, Inc., San Francisco, Calf.	$214,820
2. Sibley Grading & Teaming Co., San Francisco, Calif.	219,840
3. MacDonald & Kahn, Ltd., San Francisco, Calif.	225,347

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Steel pipe, 60 in., coating.	9,570 l. f.	$14.28	$12.95	$13.65
2. Roundabout seams	35 each	67.00	31.25	40.00
3. Excav., backfill up to 8 ft. depth	9,400 l. f.	3.75	5.57	5.00
4. Excav., backfill, 8 to 10 ft.	254 c. y.	6.00	7.50	2.70
5. Excav., backfill, over 10 ft. depth	406 c. y.	2.00	12.00	3.00
6. Excav. drains, backfill, normal	100 c. y.	2.20	5.00	3.50
7. Excav., backfill, blow off trench	100 c. y.	2.20	5.00	3.50
8. Remove, replace pavement	1,100 s. f.	.30	.35	.36
9. Drain installation	250 l. f.	1.20	1.00	.80
10. Steel pipe, 60 in.	9,400 l. f.	1.83	1.98	2.15
11. Bell, spigot joints, fittings.	153 l. f.	.35	1.00	1.50
12. Fitting installation	40,000 lb.	.07	.04	.04
13. Repaving	57,000 s. f.	.30	.24	.35

PIPE REPLACEMENT, MONT.

OWNER: Town of Three Forks, Montana; F. F. Palmer, Engr., Forsyth, Mont.

PROJECT: Removing old pipe and fittings, and furnishing and installing 5 miles of 6, 8 and 10-in. cast iron pipe in Three Forks, Mont.

BIDS: Six bids were opened in November, 1937, ranging from the contract low of $52,662 to $75,012; minimum hourly wages stipulated at $1.20 for skilled and 60c. for common labor; P.W.A. project.

LOW BIDDERS:

1. Dave Manning, Hysham, Mont. (contract)	$52,662
2. Nilson-Smith Const. Co., Great Falls, Mont.	57,495
3. Threet Bros., Lovell, Wyo.	57,586

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Remove old pipe, etc.	L. S.	$1,250.00	$209.84	$300.00
2. Manhole	1 ea.	150.00	60.00	65.00
3. Concrete anchors	6 ea.	210.00	144.00	180.00
4. Fittings, cl. D, OB or PC.	16,782 lb.	.08	.10	.08
5. Check valve, 10-in., 2-in. by pass	1 ea.	138.00	150.00	130.00
6. Sleeve, 10-in	1 ea.	6.00	20.00	9.00
7. Gate valve, 10-in., C. I. valve box, 6-in	1 ea.	95.10	100.00	80.00
8. Gate valve, 8-in., C. I. valve box, 6-in	1 ea.	57.00	66.00	58.00
9. Gate valve, 6-in., C. I. valve box, 6-in	1 ea.	42.50	48.00	35.00
10. Pipe clamps, 10-in	12 ea.	48.00	60.00	18.00
11. Corp. cocks, 1¼-in	3 ea.	18.30	30.00	6.00
12. Corp. cocks, 1-in	2 ea.	5.00	10.00	3.00
13. Copper pipe, 1¼-in., conn.	1,085 l. f.	.62	.70	.60
14. Copper pipe, 1-in., conn.	820 l. f.	.52	.60	.50
15. Copper pipe, ¾-in., conn.	1,120 l. f	.48	.45	.45
16. Service reconn., ¾-in.	212 ea.	4.80	2.00	3.00
17. Service conn., 1-in	4 ea.	5.00	5.00	4.00
18. Service reconn., 1½-in.	2 ea.	5.40	8.00	5.00
19. Service reconn., 1¼-in.	1 ea.	5.80	10.00	5.00
20. Fire hydrants, repair, replace	46 ea.	9.50	17.00	15.00
21. Fire hydrants, remove, repair	11 ea.	8.00	12.50	15.00
22. C. I. pipe, cl. 150, 10-in.	6,030 l. f	2.42	2.50	2.60
23. C. I. pipe, cl. 150, 8-in.	3,198 l. f.	1.86	1.99	2.06
24. C. I. pipe, cl. 150, 6-in.	19,078 l. f.	1.31	1.48	1.54
25. C. I. pipe, cl. 150, 4-in.	12 l. f.	1.06	1.50	1.00
26. C. I. pipe, cl. 150, 3-in.	12 l. f.	.94	1.50	1.00
27. Monel metal plug, 1¼-in.	1 ea.	2.00	5.00	1.00
28. Monel bushings, 2x1¼-in.	2 ea.	2.50	8.00	2.00
29. Monel bushings, 1x¾-in.	212 ea.	1.44	1.44	1.00
30. Monel bushing, 1½x1-in.	6 ea.	1.50	2.50	1.50
31. Monel bushing, 1¼x1½-in.	1 ea.	1.25	3.00	1.50
32. Monel bushing, 1¼x1-in.	3 ea.	1.25	3.00	1.50
33. Reinstall valves, 10-in.	5 ea.	6.00	10.50	10.00
34. Reinstall valves, 8-in.	7 ea.	7.00	9.00	8.00
35. Reinstall valves, 6-in	35 ea	5.00	7.50	6.00
36. Remove, repair valve, 10-in	1 ea	5.50	15.00	10.00
37. Remove, repair valve, 8-in	1 ea	4.50	15.00	8.00
38. Remove, repair valve, 6-in	6 ea.	4.25	12.00	6.00

SEA WATER INTAKE FOR WATER SOFTENING PLANT, SOUTH CAROLINA

OWNER— Board of Township Commissioners, Sullivan's Island, Charleston County. John McCrady, engineer, Charleston, S. C.

PROJECT: Installation of zeolite softeners, using (a) sea water for regeneration; (b) lime softeners; installation of sea water intake.

BIDS: Four proposals were opened May 19, 1937, ranging from the low of $15,092 to a high of $17,396 for the complete work.

CONDITIONS: The site of the work is accessible by water and highway. Completion is scheduled for 60 days after contract award with minimum hourly wages stipulated at 75 c. for skilled, 35 c. for semi-skilled, and 25 c. for common labor.

MATERIALS FURNISHED: Contractor furnishes all materials required.

LOW BIDDERS:

1. J. B. McCrary Co., Atlanta, Ga.	$15,092
2. Wannamaker & Wells, Inc., Orangeburg, S. C.	16,235
3. A. H. Guion & Co., Charlotte, N. C.	17,396
4. J. B. McCrary Co. (alternative for lime softener)	13,022

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Sea water intake equip't	total	$3,200 00	$5,000.00	$4,800.00
2. C. I. pipe, 6 in	270 l. f.	1.20	1.50	1.30
3. C. I. pipe, 3 in	2,450 l. f.	.62	.90	.75
4. C. I. pipe, 2 in	1,000 l. f.	.39	.60	.55
5. Valves, 2 in, with boxes	2 each	18.00	20.00	17.00
6. Valves, 2 in, with boxes	2 each	11.50	15.00	12.00
7. Water softening equip't	total	9,600.00	8,200.00	9,800.00

WATER LINE, EUREKA, CAL.

OWNER: City of Eureka, Cal., C. C. Kennedy, Consulting Engineer.

PROJECT: Construction of pipe line unit of the Mad River Water Supply Project, with capacity of 5,000,000 gal. per day delivered at Eureka.

BIDS: Five bids were opened June 3, 1937, ranging from the low of $774,700 to a high of $914,176, with minimum wage rates stipulated of $1.10 per hr. for skilled and 45c. for common labor.

LOW BIDDERS:

1. United Concrete Pipe Corp. Los Angeles, Cal.	$774,700
2. Hanrahan-Connolly Co. San Francisco, Cal.	824,566
3. Morrison-Knudsen Co. Los Angeles, Cal.	847,670

Item	Quan.	UNIT PRICES (1)	(2)	(3)
1. Redwood stave pipe, 2 band.	51,400 l. f.	$4.45	$4.90	$4.50
2. Additional bands	38,500 ea.	.60	.63	.60
3. Drainage channel excav	600 c. y.	.60	1.00	1.00
4 Struct. steel girders, piers	95,000 lb.	.11	.10	.089
5. Reinf. steel, piers	8,000 lbs.	.07	.07	.07
6. Concrete, cl. B, fdns	462 c. y.	22.00	20.00	24.00
7. Additional cement	per c. f.	1.00	.70	.80
8. Concrete piles	28 ea.	35.00	35.00	45.00
9. Blow off valve assemblies	19 ea.	70.00	80.00	75.00
10. C. I. pipe assembly, 4 in	100 l. f.	1.50	1.00	1.50
11. Air, vacuum assemblies	31 ea.	225.00	250.00	235.00
12 Gate valves	3 ea.	650.00	800.00	700.00
13. Trestle foot walk	18 M.b.m.	100.00	80.00	75.00
14. Centrifugal conc. lined and gunite coated steel pipe, 24 in	54,200 l. f.	4.93	5.46	6.40
15. Centr. conc. pipe, 30 in	6,700 l. f.	6.33	7.00	8.15
16. Centr. conc. pipe, 30 in., tunnel	900 l f.	25.00	25.00	35.00
17. Centr. conc. pipe, welded, 30 in	1,200 l. f.	12.00	5.86	9.00
18. Centr. conc. pipe, 18 in., trench	1,245 l. f.	4.00	5.00	5.00
19. River crossing excav	3,000 c. y.	8.50	6.00	2.95
20. Concrete casing, river crossing	1,000 c. y.	10.00	12.00	15.00
21. C I. pipe, 4 in. plus 12 ft.	100 l. f.	1.00	1.00	2.50
22. Conc. piles, to 20 ft	62 ea.	35.00	24.00	24.00
23. Additional piles required	per l. f.	1.75	2.00	.60
24. Conc. fdn., 24 in., pipe	585 l. f.	37.00	26.00	5.20
25. Timber grillage pipe support	400 l. f.	1.00	1.20	1.25
26. Cent. cast conc. pipe, 30 in.	7,660 l. f.	6.33	7.00	6.20
27. Add. exp. jts. 24 in	250 ea.	12.00	20.00	18.00
28. Concrete, cl. B, anchors	120 c. y.	12.00	20.00	18.00
29. Cement added, except pipe.	per c. f.	1.00	.70	.80
30. Blow off valve assemblies	15 ea.	100.00	120.00	98.00
31 Air release, vacuum assemblies	22 ea.	200.00	300.00	200.00
32. Gate valves, 42 in	3 ea.	700.00	750.00	670.00
33. Gate valves, 20 in	6 ea.	500.00	520.00	480.00
34. Gate valves, 18 in	1 ea.	400.00	410.00	385.00
35. Gate valves, 12 in	1 ea.	170.00	180.00	190.00
36. Flow valve regulators	l. s.	4,000.00	4,000.00	3,600.00
37. Concrete manholes, wood covers	7 ea.	100.00	160.00	103.00
38. Concrete manholes, c. i., covers	3 ea.	125.00	200.00	150.00
39. Air release m.h., wood covers	6 ea.	100.00	150.00	103.00
40. Do. incl. saddle opening	6 ea.	140.00	250.00	225.00
41. Air release m.h., c.i., covers	12 ea.	125.00	225.00	205.00
42. Gate valve m.h. wood covers	7 ea.	100.00	150.00	103.00
43. Gate valve m.h., c.i. covers.	5 ea.	125.00	200.00	205.00
44. Reinf. conc. valve control pit	1 ea.	500.00	400.00	240.00
45. Reinf. conc. overflow struct.	1 ea.	800.00	300.00	260.00
46. Chlorination bldg. complete.	l. s.	3,500.00	2,300.00	5,500.00
47. Venturi installation	l. s.	2,300.00	2,075.00	1,925.00
48. Monorail trolley, hoist, pump, etc	l. s.	1,600.00	1,150.00	1,300.00

WATER MAIN EXTENSION, MICH.

OWNER: City of Marysville, Mich.; Pate & Hirn, Detroit engineers.

PROJECT: Construction of 9,000 ft. of 6 to 16-in. cast iron pipe for watermain extension in Marysville, Mich., specified trench cover is 5 ft. Underground utility conduit will be encountered along 500 ft. of 8-in. main; three railroad crossings are to be provided for; and 200 or 300 ft. of excavation will be in wet sand requiring pumping.

BIDS: Fourteen bids were opened, and contract awarded in June, 1937, ranging from the low of $20,302 to a high of $36,459, with no contract completion time scheduled, and the owner furnishing 800 ft. of 16-in. main.

LOW BIDDERS:

1. Brandon Reed Co., Detroit, Mich. (contract)	$20,302
2. W. L. Johnson, Toledo, Ohio	20,746
3. Ray D. Baker, Detroit, Mich	21,594

Item	Quan.	Unit Prices (1)	(2)	(3)
1. C. I. watermain, 6 in	150 l. f.	$1.45	$1.76	$1.45
2. C. I. watermain, 8 in	7,520 l. f.	1.67	1.78	1.83
3. C. I. watermain, 10 in	70 l. f.	2.80	2.29	2.42
4. C. I. watermain, 16 in	950 l. f.	4.35	4.04	4.28
5. C. I. watermain, 16 in., lay	800 l. f.	.95	.95	1.11
6. Fittings, 6 in	300 lb.	.07	.07	.06
7. Fittings. 8 in	4,200 lb.	.07	.07	.06
8. Fittings, 10 in	800 lb.	.07	.07	.06
9. Fittings, 16 in	2,700 lb.	.07	.07	.06
10. Valves, 6 in	12 ea.	25.00	25.00	26.00
11. Valves, 8 in	8 ea.	38.50	40.00	40.00
12. Valves, 16 in	1 ea.	225.00	165.00	165.00
13. Valve box	20 ea.	4.50	5.00	5.00
14. Hydrants, AWWA	11 ea.	77.00	75.00	90.00
15. Water services	12 ea.	4.00	3.00	2.00
16. House services	100 l. f.	.60	.50	1.00

VILLAGE WATER SUPPLY, NEW JERSEY

OWNER: Borough of Mendham, New Jersey; Clyde Potts, Consulting Engineer, New York City.

PROJECT: Furnishing materials and constructing improvements to water supply for borough of Mendham, N. J., as per tabulation below.

BIDS: Nine bids were opened June, 1937, ranging from a low of $13,666 to a high of $20,184, with completion scheduled for three months after contract, and all materials required for the construction to be furnished by the contractor. This is a regular municipal project, without WPA or PWA aid.

LOW BIDDERS:

1. F. N. Lewis & Co., Bloomfield, N. J.	$13,666
2. J. P. Burns, Dumont, N. J.	13,962
3. New York Sewage Disposal Co., New York, N. Y.	14,971

Iten	Quan.	Unit Frices (1)	(2)	(3)
1. Earth excav. struct	550 c. y.	$0.65	$1.00	$1.25
2. Earth excav. pipe lines	1,300 c. y.	.65	1.00	1.25
3. Clearing, aux. supply line.	15 M. s. f.	12.00	5.00	1.25
4. Masonry, rock excav	50 c. y.	6.00	5.00	7.50
5. Fence removal	l. s.	50.00	30.00	25.00
6. Lumber, fdt. bracing, etc.	5 m. b. m.	75.00	10.00	75.00
7. Concrete, cl. A, 1:2:4	200 c. y.	17.50	22.00	20.00
8. Concrete, cl. B, 1:3:5	20 c. y.	15.00	15.00	18.00
9. Reinforcing steel	16,000 lb.	.065	.07	.06
10. Vitrified pipe, 4 in	158 l. f.	.50	.50	.22
11. Vitrified pipe, 6 in	18 l. f.	.60	.75	.375
12. Vitrified pipe, 8 in	26 l. f.	.75	.75	.62
13. Filter sand	170 c. y.	3.50	3.00	3.40
14. Filter gravel	55 c. y.	4.00	3.00	5.00
15. Misc. metal work	l. s.	50.00	75.00	30.00
16. Gate valves, 4 in	3 ea.	25.00	25.00	28.00
17. Gate valves, 6 in	4 ea.	35.00	35.00	45.00
18. Gate valves, 8 in	2 ea.	50.00	50.00	60.00
19. C. I. pipe, 4 in	100 l. f.	.85	.80	.90
20. C. I. pipe, 6 in	120 l. f.	1.20	1.25	1.25
21. C. I. pipe, 8 in	2,800 l. f.	1.75	1.50	1.65
22. C. I. pipe specials	2 ton	150.00	130.00	180.00

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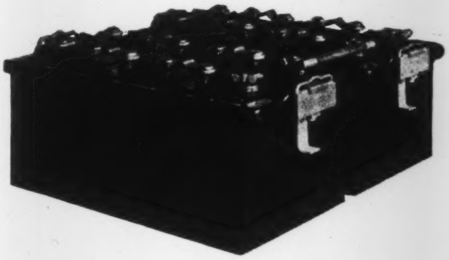

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UNIT BID PRICES—WATERWORKS

SUNSET RESERVOIR, SAN FRANCISCO

OWNER: Public Utilities Commission, San Francisco.

PROJECT: Concrete lining, roof and control works for Sunset Reservoir, Ortega, Pacheco, 24th and 28th Aves., San Francisco. Excavation of basin and construction of embankment completed under another contract. Work includes refilling of erosion channels in existing inner slopes and reservoir crest, preparation of bottom surface of basin, excavating for column footings, struts and sills, concrete lining and roof slab, installation of gates, controls, etc.

CONDITIONS: Wage rates as stipulated for all city public works: 75c. to $1.67. Contract time, 320 days. Owner furnishes gate valves, misc. metal work and cast-iron bell-and-spigot pipe.

BIDS: Eight proposals received in July, 1937, ranging from $793,397 to $960,604. Contract awarded to low bidder.

LOW BIDDERS:

1. MacDonald & Kahn, San Francisco (contract)	$793,397
2. C. L. Harney, San Francisco	798,221
3. R. G. Clifford, San Francisco	801,569

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Tamp erosion refill	300 hr.	$3.50	$6.75	$3.19
2. Trim inner slopes, crest	29,000 s. y.	.50	.42	.48
3. Prepare reservoir bottom	L. S.	11,502.00	7,700.00	8,520.00
4. Struct. excav., earth	3,200 c. y.	3.00	2.00	2.30
5. Struct. excav., rock	500 c. y.	5.00	3.00	4.80
6. Concrete, reservoir	12,870 c. y.	9.70	12.40	10.50
7. Concrete, conduit, spillway	3,200 c. y.	17.50	18.75	20.25
8. Concrete, roof slab	10,200 c. y.	23.80	20.25	22.00
9. Extra cement	400 bbl.	2.00	2.02	2.20
10. Reinf. steel	3,600,000 lb.	.05	.04605	.0493
11. Welded wire mesh, 4 x 4, No. 6	58,000 s. y.	.60	.52	.572
12. Welded wire mesh, 4 x 16, No. 6	600 s. y.	.30	.24	.26
13. Copper water stops	5,000 lb.	.70	.73	.53
14. Asbestos sheet pack'g	320 s. f.	1.25	.50	.50
15. Slide gates	L. S.	7,000.00	10,000.00	8,200.00
16. Water screen, elec. equip	L. S.	7,600.00	9,000.00	8,740.00
17. Cast steel fittings	25,000 lb.	.24	.25	.33
18. C. I. fittings, flanged	7,500 lb.	.10	.15	.15
19. Handrails, wrought steel p	13,500 lb.	.10	.23	.24
20. Struct. steel	74,000 lb.	.145	.14	.15
21. Misc. metal work	2,000 lb.	.57	.35	.22
22. Gate valves, install	39,000 lb.	.03	.03	.01
23. Install C. I. bell, misc. met	97,000 lb.	.02	.03	.04
24. Welded steel pipe 54 in.	1,050 in.	13.00	17.00	17.48
25. Welded steel pipe, 60 in	900 l. f.	14.00	18.25	20.35
26. Bev. courses, curv. secs., 54 in	10 ea.	30.00	100.00	75.22
27. Bev. courses, curv. secs., 60 in	15 ea.	35.00	100.00	91.50
28. Steel pipe specials	17,700 lb.	.10	.20	.16
29. Flex. couplings, 54 in., 3/8 in	1 ea.	90.00	100.00	110.00
30. Flex. couplings, 50 in., 3/8 in	1 ea.	100.00	100.00	119.00
31. Bit. enam. coating, steel pipe	60,000 s. f.	.08	.10	.10
32. Felt wrap, steel pipe	24,000 s. f.	.05	.06	.06
33. Excav., backfill trenches, earth	7,700 c. y.	1.60	2.30	1.27
34. Excav. backfill trenches, rock	500 c. y.	6.00	5.50	1.92
35. Repavement	12,000 s. f.	.35	.26	.48
36. Reinf. conc. pipe, 24 in	890 l. f.	5.40	5.40	4.74
37. Roof screens	L. S.	3,000.00	2,000.00	3,433.00
38. Conc. sidewalks	10,000 s. f.	.25	.15	.16
39. Armored conc. curbs	210 l. f.	1.50	1.00	.70
40. Chain-link fence	L. S.	2,800.00	3,000.00	2,700.00
41. Tri. mesh fence, redwood posts	L. S.	300.00	400.00	18.00
42. Road grading	800 c. y.	1.75	.50	.60
43. Repair outer embankment slopes	200 c. y.	5.00	2.75	.70
44. Seal construct. joints	43,500 l. f.	.06	.23	.10

WATERWORKS, BENTON, LA.

OWNER: City of Benton, La.; R. L. Tatum, Engineer, Shreveport, La.

PROJECT: Construction of concrete reservoir and distribution system forming part of the Benton, La., waterworks project, excluding only the deep well, turbine pump and elevated tank provided for in other contracts.

BIDS: Five bids were opened in January, 1938, ranging from the contract low of $14,754 to $15,929.

LOW BIDDERS:

1. J. B. McCrary Co., Atlanta, Ga. (contract)	$14,754
2. McEachin & McEachin & Co., Little Rock, Ark.	14,774
3. Robt. Deselle, Cheneyville, La., and Dixie Mill & Supply Co., New Orleans, La.	14,943

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Cast iron pipe, 8 in	70 l. f.	$1.66	$1.50	$1.55
2. W. Cast iron pipe, 6 in	4,500 l. f.	1.14	1.11	1.17
3. Cast iron pipe, 2 in	13,000 l. f.	.42	.44	.405
4. C. i. specials, 6 & 8 in	2.5 ton	135.00	150.00	108.00
5. C. i. specials, 2 in	0.3 ton	200.00	200.00	190.00
6. Galv. pipe, 1 in	1,060 l. f.	.30	.25	.255
7. Gate valve, 8 in. fl	1 ea.	44.00	44.00	43.65
8. Gate valve, 6 in. fl	6 ea.	30.00	27.00	26.67
9. Gate valve, 4 in. fl	1 ea.	19.00	19.00	18.43
10. Check valve, 4 in	1 ea.	17.00	16.00	16.08
11. Gate valves, 2 in	17 ea.	10.00	10.00	9.21
12. Gate valves, 2 in	1 ea.	8.00	3.00	1.68
13. Adj. valve boxes	28 ea.	3.00	2.50	2.50
14. Copper water tube, ¾ in	1,800 l. f.	.32	.35	.32
15. Corporation cocks, ¾ in	85 l. f.	1.50	1.50	.97
16. Curb cocks, ¾ in	85 ea.	2.00	2.50	2.20
17. Fire hydrant, 6 in	11 ea.	58.00	55.00	60.40
18. Water meters, ⅝ x ¾ in	85 ea.	8.50	8.00	10.00
19. Water meter boxes	85 ea.	2.35	3.00	2.40
20. Flanged pipe, 8 in	100 l. f.	1.90	1.99	1.93
21. Flanged pipe, 4 in	30 l. f.	1.60	1.00	.90
22. Fl. pipe exp. joint conn., 8 in	1 ea.	50.00	4.00	71.35
23 Fl. pipe exp. joint conn., 4 in	1 ea.	40.00	3.00	19.45
24. C. i. flanged spec., 4–8 in	0.2 ton	200.00	150.00	200.00

DEEP WELL, TWIN CITY, GA.

OWNER: Twin City, Ga., Water Works Dept.; Elroy G. Smith, Augusta, Consulting Engineer.

PROJECT: Construction of deep well for the new Twin City, Ga. waterworks system, financed through WPA funds, with dimensions as indicated in accompanying tabulations.

BIDS: Six bids were opened in November, 1937, ranging from a low of $1,889 to $3,390.

LOW BIDDERS:

1. Wheatley & Mohr, Twin City, Ga.	$1,889
2. Gray Well & Pump Co., Twin City, Ga.	2,172
3. Stevens Southern Co., Twin City, Ga.	2,346

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Set up	L. S.	$25.00	$25.00	$20.00
2. Drill, 6 in	300 ea.	1.25	2.00	2.75
3. Drill, 8 in	125 ea.	1.50	2.50	2.85
4. Drill, 10 in	100 ea.	1.75	3.00	2.95
5. Set casing, 6 in	200 ea.	.10	.05	.06
6. Set casing, 8 in	125 ea.	.15	.08	.08
7. Set casing, 10 in	100 ea.	.20	.10	.10
8. Pull casing, 6 in	10 ea.	1.50	2.50	.06
9. Pull casing, 8 in	10 ea.	2.00	2.50	.08
10. Set screen, 6 in	10 ea.	2.50	1.00	.06
11. Set screen, 8 in	10 ea.	3.00	1.00	.08
12. Remove lines, 6 in	1 ea.	25.00	10.00	3.00
13. Remove lines, 8 in	1 ea.	25.00	10.00	3.62
14. Drive shoes, 6 in	1 ea.	10.17	8.00	12.00
15. Drive shoes, 8 in	1 ea.	14.52	12.50	17.00
16. Drive shoes, 10 in	1 ea.	22.96	22.50	20.00
17. Seals, 6 in	1 ea.	17.90	25.00	24.00
18. Seals, 8 in	1 ea.	21.44	25.00	25.00
19. Furnish casing, 6 in	200 ea.	1.0893	1.10	1.00
20. Furnish casing, 8 in	125 ea.	1.5133	1.65	1.60
21. Furnish casing, 10 in	100 ea.	1.9587	2.00	1.75
22. Furnish screen, cost plus 10 per cent	......	......	......	......
23. Develop well	10 hr.	2.50	2.00	1.00
24. Test well	20 hr.	10.00	3.00	5.00
25. Special work	5 hr.	2.50	3.00	5.00

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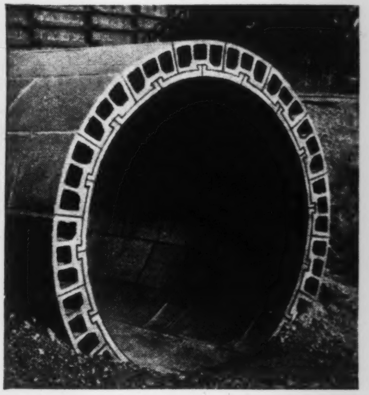

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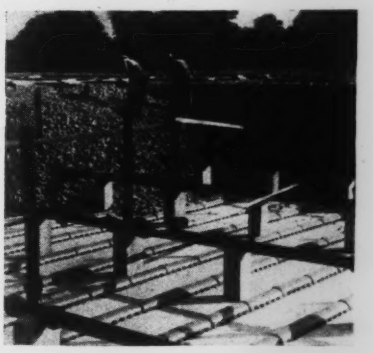

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UNIT BID PRICES—SEWERS

SEWERS, TURNERS STATION, MD.

OWNER: Baltimore County Metropolitan District; S. A. Green, Chief Engineer.

PROJECT: Installation of 17,000 lin.ft. of 6 to 15-in. vitrified tile sewer pipe at Turners Station, Md.

BIDS: Five bids were opened June 28, 1937, ranging from a low of $51.704 to a high of $73.054, with completion scheduled for 90 days after award and all materials to be furnished by the contractor.

LOW BIDDERS:

1. A. S. Mundy Co., Inc., Woodbridge, N. J...	$51,704
2. Louis Aiello, Baltimore, Md..............	52,393
3. Morocco Const. Co., Baltimore, Md........	64,801

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excav. and backfill for 15 in	970 l. f.	$2.20	$4.50	$5.00
2. V. p. sewer, Cem. joints, 15 in	970 l. f.	1.90	1.30	1.00
3. Excav. and backfill for 12 in	890 l. f.	1.60	3.50	3.00
4. V. p. sewer, cem. joints, 12 in	890 l. f.	1.32	.60	.72
5. Excav. and backfill for	770 l. f.	1.52	3.00	3.00
10 in	770 l. f.	1.52	3.00	3.00
6. V. p. sewer, cem. joints, 10 in	770 l. f.	1.32	.50	.60
7. Excav. and backfill for 8 in.	10,170 l. f.	1.20	1.50	2.60
8. V. p. sewer, cem. joints, 8 in	10,170 l. f.	.80	.35	.44
9. Cl B. c. i. p., 8 in	l. s.	2,000.00	2,500.00	2,016.00
10. Excav. and backfill for house conn	4,270 l. f.	.95	1.00	1.40
11. V. p. house conn., 6 in	4,270 l. f.	.45	.30	.28
12. Y branch, v.p., 8 in	193 each	1.90	1.00	1.20
13. Y branch, v. p., 10 in	9 each	2.35	1.50	1.50
14. Y branch, v. p., 12 in	23 each	2.73	2.00	2.00
15. Y branch, v. p., 15 in	6 each	3.98	3.00	4.00
16. Brick m. h., 8 in., under 12 ft	395 v. f.	11.00	10.00	10.00
17. Brick m. h., 8 in., over 12 ft	14 v. f.	16.00	15.00	12.00
18. Manholes, over 4 ft	8 l. f.	6.00	3.00	6.00
19. Type "A" drop conn., 12 in	1 each	40.00	25.00	15.00
20. Type "A" drop conn., 8 in	4 each	30.00	20.00	9.00
21. V. p. stubs, 8 in., in m. h	2 each	2.00	1.00	2.00
22. Conc. cradle, Cl. "B"	120 c. y.	15.00	14.00	10.00
23. Conc. cradle, Cl. "C"	10 c. y.	12.00	13.00	9.00
24. Shoring, bracing	225 M.b.m.	20.00	20.00	20.00
25. Excav. rock	10 c. y.	1.00	10.00	7.00
26. Tile underdrain, 4 in	5,000 l. f.	.15	.15	.15
27. Tile underdrain, 6 in	2,000 l. f.	.25	.25	.25
28. Excav., refill below subgt	50 c. y.	5.00	4.00	3.00
29. Excav., gravel refill	50 c. y.	9.00	7.00	3.00
30. Misc. excav., refill	25 c. y.	2.00	3.00	2.00
31. Replace conc. sidewalks	1,200 s. f.	.25	.18	.25
32. Conc. roads	20 s. y.	5.00	3.00	2.50
33. Macadam roads	220 s. y.	1.65	1.50	1.80
34. Perm. cinder roads	75 s. y.	1.00	1.00	.40
35. Type "A" drop conn., 15 in	1 each	100.00	30.00	20.00

SEWAGE PLANT, BUFFALO

OWNER: Buffalo Sewer Authority; Greeley & Hansen, Engineers.

PROJECT: Construction of sludge disposal building, sludge digestion tanks, brick stack, and electrical and boiler plant equipment in connection therewith for the Buffalo Sewer Authority for which bids were opened June 22, 1937.

LOW BIDDERS:

I. Sludge Disposal Bldg.	
1. F. H. McGraw & Co., Inc., New York, N. Y...	$321,920
2. Engstrom Wynn, Inc., Wheeling, W. Va.....	337,680
3. F. A. Canuso & Son, Philadelphia, Pa.......	341,711
II. Sludge Digestion Tanks.	
1. Lombardo Bros. Const. Co., Cleveland, O....	455,739
2. Constructors & Engineers, Inc., Chicago, Ill...	458,451
3. F. H. McGraw & Co., Inc., New York, N. Y....	481,245
III. Brick Stack (Lump Sum)	
1. Roy C. Siegel, Buffalo, N. Y..............	28,783
2. A. Custodis Chimney Const. Co., New York, N. Y.	40,893
IV. Boiler Plant Equipment (Lump Sum)	
1. E. J. Leary, Buffalo, N. Y.................	68,964
2. Ralph J. Moran, Buffalo, N. Y..............	72,30
3. John W. Danforth Co., Buffalo, N. Y........	72.789
V. Electrical Work—Sludge Disposal.	
1. McCarthy Bros. & Ford, Buffalo, N. Y........	36,980
2. Sterns Elec. Co., Buffalo, N. Y.............	38.258
3. Wipperman & Mitchell, Inc., Buffalo, N. Y...	38.643

I—SLUDGE DISPOSAL BUILDING

Item	Quan.	Unit Prices (Principal Items Only)		
1. Earth excavation	11,500 c. y.	$2.90	$3.80	$3.45
2. Rock excavation	50 c. y.	6.00	5.00	3.00
3. Selected fill	1,000 c. y.	1.50	1.80	1.50
4. Earth embankment	2,500 c. y.	.70	.60	.50
5. Earth excav. additional	2,000 c. y.	3.50	4.00	2.00
6. Remove pier	L. S.	4,000.00	500.00	3,000.00
7. Wood sheeting	70 M.b.m.	60.00	25.00	20.00
8. Steel sheeting	50,000 lb.	.03	.015	.02
9. Wood sheet piles	20 M.b.m.	60.00	75.00	90.00
10. Steel sheet piles	25,000 lb.	.04	.05	.045
11. Timber piles	500 l. f.	1.00	1.00	.65
12. Steel H piles	6,500 l. f.	1.50	2.00	1.50
13. Pile caps	10 M.b.m.	80.00	120.00	100.00
14. Wood foundations	20 M.b.m.	80.00	80.00	100.00
15. Pile load tests	5 each	300.00	500.00	300 00
16. Earth load tests	5 each	200.00	60.00	300.00
17. Reinforcing steel	425,000 lb.	.05	.05	.043
18. Reinforcing mesh	5,000 lb.	.08	.07	.06
19. Concrete, cl. A1, slabs, beams	1,250 c. y.	20.00	23.00	24.76
20. Concrete, cl. 2, floors, ftgs.	1,550 c. y.	13.00	12.00	15.00
21. Concrete, cl. B	750 c. y.	11.00	10.00	11.00
22. Precast concrete	10 c. y.	40.00	40.00	40.00
23. Rubbed finish	23,000 s. f.	.10	.10	.10
24. Copper expansion joints	200 l. f.	1.00	2.00	.80
25. Mastic expansion joints	100 s. f.	.50	.35	.20
26. Painted asphalt joints	100 s. y.	.40	.30	.50
27. Misc. common brick masonry	25 c. y.	40.00	25.00	30 00
28. Underdrains	100 l. f.	1.00	.40	1.00
29. C. I. pipe, b & s, 12 ft	30,000 lb.	.05	.06	.058
30. C. I. pipe, b & s, 3–12 ft	10,000 lb.	.06	.09	.093
31. C. I. pipe, b & s specials	11,000 lb.	.08	.14	1.25
32. C. I. pipe, flanged, 12 ft	8,000 lb.	.06	.07	.066
33. C. I. pipe, flanged, 3-12 ft.	11,000 lb.	.08	.12	.09
34. C. I. pipe, flanged special	24,000 lb.	.12	.17	.13
35. Valves, 4 in. plus	L. S.	3,000.00	3,100.00	2,700.00
36. Floor stands	L. S.	500.00	325.00	250 00
37. Structural steel	425,000 lb.	.052	.065	.0575
38. Misc. steel iron	10,000 lb.	.15	.15	.15
39. Iron castings	3,000 lb.	.12	.10	.15
40. Pipe supports	L. S.	2,100.00	1,000.00	1,000.00
41. Bronze, brass, copper	500 lb.	1.20	1.00	.75
42. Aluminum	500 lb.	1.70	1.00	1 25
43. Galvan. floor grating	3,500 s. f.	1 80	1.70	2 25
44. Pipe railing	1,000 l. f.	2.00	1.70	2.50

II—SLUDGE DIGESTION TANKS

Item	Quan.	Unit Prices (Principal Items Only)		
1. Earth excavation	24,000 c. y.	$2.30	$2.25	$2.30
2. Rock excavation	50 c. y.	5.00	5.00	6.00
3. Selected fill	2,000 c. y.	1.00	2.00	1.50
4. Earth embankment	3,000 c. y.	.50	.50	.60
5. Earth excav. additional	2,500 c. y.	1.00	2.75	3.00
6. Remove pier	L. S.	2,000.00	4,000.00	4,500.00
7. Wood sheeting	20 M.b.m.	40.00	35.00	40.00
8. Steel sheeting	25,000 lb.	.03	.03	.03
9. Wood sheet piles	20 M.b.m.	40.06	100.00	70.00
10. Steel sheet piles	450,000 lb.	.06	.045	.045
11. Timber piles	80,000 l. f.	.35	.55	.60
12. Steel H piles	300 l. f.	10.00	2.50	2.50
13. Pile capping	10 M.b.m.	100.00	90.00	80.00
14. Wood foundations	20 M.b.m.	80.00	90.00	80.00
15. Pile load tests	5 each	300.00	300.00	300.00
16. Earth load tests	5 each	200.00	275.00	200.00
17. Reinforcing steel	800,000 lb.	.05	.046	.05
18. Reinforcing mesh	5,000 lb.	.10	.07	.08
19. Concrete, cl. A1, slabs, beams	2,200 c. y.	25.00	23.00	23.00
20. Concrete, cl. A2, floors, ftgs	1,800 c. y.	16.00	14.00	15.00
21. Concrete, cl. B	300 c. y.	10.00	12.00	11.00
22. Precast concrete	10 c. y.	40.00	40.00	40.00
23. Rubbed finish	15,000 s. f.	.10	.12	.10
24. Copper expansion joints	100 l. f.	1.00	1.20	1.00
25. Mastic expansion joints	250 s. f.	1.00	.50	.50
26. Painted asphalt joints	650 s. y.	.65	.30	.40
27. Poured asphalt joints	1,350 gal.	.40	1.60	1.00
28. Misc. common brick masonry	60 c. y.	25.00	35.00	40.00
29. Underdrains	100 l. f.	1.00	1.00	1.00
30. C. I. pipe, b & s, 12 ft	60,000 lb.	.05	.0493	.05
31. C. I. pipe, b & s, 3–12 ft	33,000 lb.	.07	.0726	.055
32. C. I. pipe, b & s, specials	21,000 lb.	.09	.0883	.08
33. C. I. pipe, flanged, 12 ft	7,000 lb.	.06	.067	.065
34. C. I. pipe, flanged, 3–12 ft.	60,000 lb.	.10	.0882	.075
35. C. I. pipe, flanged specials.	60,000 lb.	.12	.1164	.10
36. Structural steel	80,000 lb.	.08	.075	.07
37. Misc. iron, steel	3,000 lb.	.15	.15	.15
38. Iron castings	2,500 lb.	.15	.15	.12
39. Pipe supports	L. S.	4,000.00	3,000.00	3,700.00
40. Bronze, brass, copper	500 lb.	1.00	1.00	1.20
41. Aluminum	200 lb.	1.00	2.50	1.70
42. Galvan. floor grating	120 s. f.	2.50	2.50	2.00
43. Pipe railing	20 l. f.	4.00	2.50	4.00

V—ELECTRICAL WORK, SLUDGE DISPOSAL

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Power equipment	L. S.	$29,340.00	$30,200.00	$30,796.00
2. Indoor fixtures	125 each	27.00	28.00	26.25
3. Entrance fixtures	6 each	80.00	78.00	77.50
4. Steel conduit, 3/4 in	5,000 l. f.	.32	.25	.265
5. Steel conduit, 1 in	1,000 l. f.	.31	.35	.34
6. Steel conduit, 1 1/4 in	500 l. f.	.41	.45	.465
7. Steel conduit, 1 1/2 in	500 l. f.	.51	.48	.495
8. Cable, No. 12, R. I. single, AWG	15,000 l. f.	.036	.04	.038
9. Do. No. 10, AWG	500 l. f.	.056	.06	.055
10. Do. No. 8, AWG	500 l. f.	.07	.08	.09
11. Lighting outlet boxes	131 each	1.90	2.00	1.95
12. S. P. wall switch, dust covers	40 each	6.00	6.50	5.90
13. S. P. wall switch, std. covers	10 each	4.10	4.00	3.85
14. Switch, 3 way, std. cover	10 each	4.50	4.50	4.28
15. Switch, 3 way, dust cover	20 each	6.40	7.50	5.68
16. Receptacle, 2 pole, 115 V, d. t.	40 each	6.00	7.00	5.63
17. Receptacle, 3 pole, 220 V, d. t.	5 each	10.00	8.50	11.25
18. Receptacle, 2 pole, 115 V, std	25 each	3.60	4.00	4.25
19. Receptacle, 3 pole, 220 V, std	25 each	7.20	7.00	9.55

LOUISVILLE SEWERS

OWNER..Sewerage Commissioners, Louisville, Ky.; W. M. Caye, Engineer.

PROJECT: Construction of 1,100 lin.ft. clay sewer pipe, up to 18 in. diameter, comprising E.R.A. project No. 18, the Wellington Court contract, in Louisville, Ky.

BIDS: Seven bids were opened in October, 1937, with completion scheduled for 80 days by the low bidder, and minimum hourly wages stipulated of 70c. for skilled and 33 1/3c. for common labor. Contractor supplies all materials required for construction exclusive of manhole tops and castings.

LOW BIDDERS:

1. W. L. Hailey & Co., Nashville, Tenn. (contract)	$37,757
2. Charles E. Cannell Co., Inc., Louisville, Ky.	37,916
3. Columbia Const. Co., Louisville, Ky	40,378

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Earth excav., backfill	1,127 l. f	$9.00	$9.40	$8.50
2. Rock excav., backfill	1,960 c. y.	7.47	6.00	9.00
3. Concrete, cl. A	482 c. y.	19.00	23.00	20.00
4. Concrete, cl. A	20 c. y.	30.00	46.00	40.00
5. Concrete, cl. C	75 c. y.	14.00	14.00	10.00
6. Brick masonry	1 c. y.	35.00	35.00	25.00
7. Vitrified brick lining	10 s. y.	4.50	5.00	6.00
8. Reinforcing steel	12,000 lb.	.05	.07	.05
9. Earth excav. below sewer	50 c. y.	2.50	1.50	1.00
10. Gravel refill below sewer	50 c. y.	3.50	3.50	.10
11. A. S. T. M. clay sewer pipe, to 18 in. (percentage of $758.40)	p. c.	60 p. c.	55 p. c.	60 p. c.
12. Lay pipe, cement mortar, 6 in	525 l. f.	.35	.40	.30
13. Lay pipe, cement mortar, 8 in	10 l. f.	.35	.40	.30
14. Lay pipe, cement mortar, 10 in	10 l. f.	.40	.40	.30
15. Lay pipe, cement mortar, 12 in	10 l. f.	.50	.40	.40
16. Lay pipe, cement mortar, 15 in	80 l. f.	.60	.60	.40
17. Lay pipe, cement mortar, 18 in	10 l. f.	.75	1.00	.60
18. Lay underdrain, 4 in	500 l. f.	.30	.30	.40
19. Lay underdrain, 6 in	600 l. f.	.40	.40	.40
20. Asphalt pavement	80 s. y.	3.00	4.00	3.50
21. Progress and completion, $25.00 per day		80 d.	100 d.	90 d.

SANITARY SEWERS, LA.

OWNER: City of Abbeville, La.; J. B. McCrary Eng. Corp., Engineers, Atlanta, Ga.

PROJECT: Construction of 18 mi. 6, 8 and 10-in. sewer for Abbeville, La., sanitary system, financed through PWA, with alternative bids submitted on cement concrete and vitrified clay pipe.

BIDS: Two bids for each pipe alternative and eight bids for the construction of the system were opened in November, 1937, with a low of $21,314 submitted for the vitrified clay pipe as compared with a low of $22,196 for the cement concrete alternative. The eight bids for construction ranged from $164,233 to $224,098, with minimum hourly wages stipulated of 60c. for skilled and 30c. for common labor, and completion scheduled for 175 days after contract award.

LOW BIDDERS:

I—Cement concrete pipe alternative.	
1. Gifford Hill & Co., Inc., Dallas, Texas	$ 22,196
2. Central Culvert Co., Inc., Alexandria, La.	23,530
II—Vitrified clay alternative.	
1. W. S. Dickey Mfg. Co., Texarkana, Texas	21,314
2. Volz Const. Co., Ripley, Tenn.	35,761
III—Construction of system.	
1. Drainage Const. Co., Linwood, Calif.	164,233
2. W. H. O'Toole Const. Co., Pensacola, Fla.	164,365
3. Mike Mitchell & Sons, New Orleans, La.	175,073

I — CEMENT CONCRETE PIPE

Item	Quan.	Unit Prices (1)	(2)
1. Pipe, 6-in	13,300 l. f.	$0.15	$0.15
2. Pipe, 8-in	68,000 l. f.	.21	.22
3. Pipe, 10-in	9,000 l. f.	.29	.32
4. Pipe, 12-in	100 l. f.	.48	.48
5. Bends, 45 deg., 6-in	1,300 ea.	.50	.65
6. Stoppers, 6-in	2,000 ea.	.04	.02
7. Wye branches, 10x6-in	250 ea.	1.45	1.55
8. Wye branches, 8x6-in	2,050 ea.	1.05	1.15
9. Tees, 8x8-in	11 ea.	1.05	1.15
10. Bends, 90 deg., 8-in	11 ea.	1.00	.85

II — VITRIFIED CLAY PIPE ALTERNATIVE

		(1)	(2)
1. Pipe, 6-in	13,300 l. f.	.133	.25
2. Pipe, 8-in	68,000 l. f.	.205	.35
3. Pipe, 10-in	9,000 l. f.	.311	.425
4. Pipe, 12-in	100 l. f.	.402	.55
5. Bends, 45 deg., 6-in	1,300 ea.	.532	.77
6. Stoppers, 6-in	2,000 ea.	.03	.05
7. Wye branches, 10x6 in	250 ea.	1.26	2.12
8. Wye branches, 8x6-in	2,050 ea.	.82	1.51
9. Tees, 8x8-in	11 ea.	.82	1.51
10. Bends, 90 deg., 8-in	11 ea.	.82	1.21

III — CONSTRUCTION OF SYSTEM

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Sewer, 8-in., depth 0–4 ft	790 l. f.	$0.55	$0.35	$0.28
2. Sewer, 8-in., depth 4–6 ft	37,505 l. f.	.56	.37	.30
3. Sewer, 8-in., depth 6–8 ft	21,420 l. f.	.58	.50	.60
4. Sewer, 8-in., depth 8–10 ft	9,065 l. f.	.64	.75	.90
5. Sewer, 8 in., depth 10–12 ft	1,815 l. f.	1.14	1.10	1.29
6. Sewer, 8-in., depth 12–14 ft.	195 l. f.	1.65	3.00	3.00
7. Sewer, 8-in., depth 14–16 ft.	10 l. f.	2.65	6.00	7.00
8. Sewer, 10-in., depth 0–4 ft	270 l. f.	.56	.42	.32
9. Sewer, 10-in., depth 4–6 ft	1,320 l. f.	.57	.44	.40
10. Sewer, 10-in., depth 6–8 ft	1,780 l. f.	.59	.60	.65
11. Sewer, 10-in., depth 8–10 ft.	1,520 l. f.	.74	1.20	1.25
12. Sewer, 10-in., depth 10–12 ft.	2,845 l. f.	1.14	1.80	1.45
13. Sewer, 10-in., depth 12–14 ft.	1,400 l. f.	1.64	4.00	2.75
14. Sewer, 10-in., depth 14–16 ft.	540 l. f.	2.64	7.00	3.00
15. Sewer, 12-in., depth 14–16 ft.	100 l. f.	2.80	8.00	5.00
16. Manholes compl't, 0–4 ft	7 ea.	40.00	40.00	50.00
17. Manholes, 4–6 ft	146 ea.	50.00	45.00	65.00
18. Manholes 6–8 ft	59 ea.	60.00	60.00	100.00
19. Manholes 8–10 ft	29 ea.	73.00	70.00	120.00
20. Manholes 10-12 ft	15 ea.	88.00	80.00	157.00
21. Manholes 12–14 ft	5 ea.	110.00	90.00	175.00
22. Manholes 14–16 ft	3 ea.	130.00	100.00	200.00
23. Drop connections	11 ea.	6.00	20.00	20.00
24. Set wye branches, 10x6-in	250 ea.	1.35	.50	1.25
25. Set wye branches, 8x6-in	2,050 ea.	1.25	.40	1.25
26. C.i.p. sewers, 10-in	48 l.f.	1.80	1.80	2.00
27 C.i.p. sewers, 8-in	96 l.f.	1.35	1.50	1.75
28. C.i.p. casing, 18-in	48 l.f.	7.75	4.00	5.00
29. C.i.p. casing, 16-in	12 l. f.	7.00	3.00	5.00
30. Relay conc. pav't	1,125 l. f.	.60	.60	.80
31. Relay shell pav't	2,100 l. f.	.20	.08	.20
32. Relay gravel pav't	64,710 l. f.	.10	.11	.18
33. Concrete, cl. B	3 c. y.	15.00	20.00	20.00
34. Riser pipe, 6-in	1,300 l. f.	.25	.30	.25
35. Set bends, 6-in	300 ea.	.25	.40	.20
36. Timber foundations	2,500 l. f.	.25	.25	.20
37. Conn lines to new m.h.	5 ea.	5.00	10.00	10.00
38. Conn. new lines to m.h.	6 ea.	5.00	15.00	10.00
39. Change exist. services	12 ea.	10.00	5.00	3.00
40. Service connections	12,000 ea.	.35	.30	.25
41. C.i. pipe, 12-in	3,850 l. f.	2.70	2.70	3.16
42. C.i. pipe, 10-in	2,875 l. f.	2.15	2.15	2.72
43. C.i. pipe, 8-in	2,650 l. f.	1.70	1.70	1.80
44. C.i. pipe, 6-in	125 l. f.	1.30	1.15	1.40
45. C.i. syphon, 6-in	1 ea.	$1,500.00	$2,200.00	$2,500.00
46. Sewage pump stations	3 ea.	4,000.00	3,500.00	4,762.33
47 Sewage pump stations	1 ea.	4,500.00	4,300.00	5,154.00
48. Sewage disposal plant	L.S.	38,700.00	42,500.00	34,287.00

UNIT BID PRICES—SEWERS

SEWAGE PLANT BUILDING, BUFFALO

OWNER: Buffalo Sewer Authority; Greeley & Hansen, Engineers.

PROJECT: Construction of main building, service tunnels, sewage conduits and meters, forming part of intercepting sewer and sewage treatment project. This particular contract, Division XV, will provide for the housing of the general administration offices, laboratory, machine shop, garage, chlorination apparatus, aeration blowers, sewage metering equipment, transformers, water storage tank and miscellaneous equipment; and the furnishing of sewage meters, sewage aeration and chlorinating equipment, plumbing, heating, ventilating, piping and electrical work.

BIDS: Six bids were received in October 1937 ranging from $565,002 to $699,522. Minimum hourly wage rates are stipulated at 65c. for common labor; skilled rates range from to $1.50.

LOW BIDDERS:

1. Couse and Saunders, Detroit, Mich.	$565,002
2. F. H. McGraw & Co., New York, N. Y.	594,795
3. John W. Cowper Co., Buffalo, N. Y.	605,463

The following tabulation of unit bid prices omits those classifications of the construction which appear as lump sum items.

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Earth excavation	20,000 c. y.	$1.00	$1.80	$2.06
2. Rock excavation	10 c. y.	5.00	20.00	31.40
3. Selected fill material	1,000 c. y.	1.50	1.00	2.38
4. Earth embankments	1,500 c. y.	.40	.50	.64
5. Additional earth excav.	100 c. y.	2.50	3.60	3.88
6. Constr. wood sheeting	20 M.b.m.	25.00	50.00	70.00
7. Constr. steel sheeting	25,000 lb.	.025	.03	.025
8. Wood sheet piling	20 M.b.m.	85.00	60.00	110.00
9. Steel sheet piling	25,000 lb.	.055	.04	.045
10. Timber piles	12,500 l. f.	.788	.55	.565
11. Steel H piles	7,300 l. f.	2.17	2.50	2.20
12. Pile caps	10 M.b.m.	80.00	60.00	115.00
13. Plank, timber fdns	20 M.b.m.	80.00	60.00	100.00
14. Pile load tests	3 each	300.00	200.00	275.00
15. Earth load tests	3 each	200.00	250.00	110.00
16. Reinforcing steel	800,000 lb.	.0425	.055	.038
17. Reinforcing mesh	5,000 lb.	.069	.08	.08
18. Concrete, cl. A, wall, beam, slab	3,650 c. y.	21.75	21.00	18.45
19. Concrete, cl. A2, floors, footings	1,850 c. y.	13.00	14.00	11.40
20. Concrete, cl. B	100 c. y.	10.00	13.00	8.50
21. Precast concrete	25 c. y.	35.00	40.00	82.00
22. Rubbed finish	55,000 s. f.	.09	.10	.065
23. Sheet copper exp. joints	1,500 l. f.	1.10	1.50	1.46
24. Sheet mastic joints, ½ in.	500 s. f.	.30	.50	.40
25. Painted asphalt joints	100 s. y.	1.02	.40	.70
26. Brick masonry	25 c. y.	26.00	30.00	26.00
27. Vitrified liner plates	6,000 s. f.	.32	.30	.41
28. C. I. pipe, B&S, 12 ft. lengths	150,000 lb.	.057	.05	.058
29. C. I. pipe, B&S, 3–12 ft.	20,000 lb.	.079	.085	.10
30. C. I. pipe, B&S, specials	25,000 lb.	.09	.10	.12
31. C. I. pipe, flanged, 12 ft. lengths	5,000 lb.	.068	.06	.07
32. C. I. pipe, flanged, 3–12 ft.	10,000 lb.	.09	.09	.105
33. C. I. pipe, specials, flanged.	20,000 lb.	.113	.11	.125
34. Structural steel	320,000 lb.	.0525	.055	.055
35. Misc. steel, iron	5,000 lb.	.117	.15	.13
36. Iron castings	3,000 lb.	.163	.20	.17
37. Bronze, brass, copper	500 lb.	.522	1.00	.60
38. Aluminum	500 lb.	1.17	1.20	1.17
39. Galv. floor grating	200 s. f.	2.18	2.00	1.86
40. Pipe railing	100 l. f.	2.50	2.50	2.10
41. Aeration plate containers	48 each	50.00	60.00	49.00
42. Aeration plates	480 each	2.80	3.00	3.15

SEWAGE DISPOSAL, BALTIMORE

OWNER: Board of Awards, Dept. Public Works, Baltimore, Md.

PROJECT: Clearing sludge lagoon, building earth berm and earth dam and miscellaneous work at the Back River Sewage Disposal Plant in Baltimore.

BIDS: Five bids were opened in October, 1937, ranging from the contract low of $80,180 to a high of $282,900, with completion scheduled at 150 days, and prevailing city wages stipulated for hourly minimum scales.

LOW BIDDERS:

1. Frederico Bonadio, Baltimore (contract)	$80,180
2. Peter D'Adamo Construction Co., Baltimore	86,060
3. Vincent Schiavi, Wilmington, Del.	86,975

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Building earth dam	820 l. f.	$10.00	$11.00	$9.75
2. Building earth berm	5,000 c. y.	1.68	1.00	2.00
3. Remove sludge from lagoon	92,000 c. y.	.68	.77	.74
4. Cut drain ditches, berm	200 c. y.	2.60	1.00	2.00
5. Build, install wooden screen	L. S.	500.00	1,000.00	500.00

SEDIMENTATION BASINS, ATLANTA

OWNER: Council Purchasing Committee, Atlanta, Ga.; Wiedeman & Singleton, Engineers, Atlanta; C. Donaldson, Chief City Engineer.

PROJECT: Construction of 2 sedimentation basins near Howell Mill Rd., Atlanta, Ga., to settle 32 m.g.d. muddy water pumped from river. Basins are 100x410x14 ft., and form part of the city's $1,100,000 waterworks improvement program.

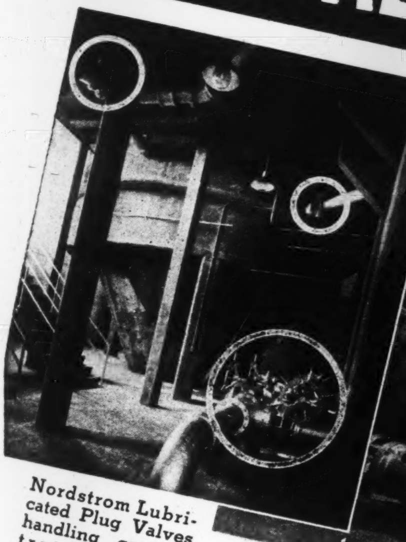
BIDS: Eleven bids were opened in November, 1937, ranging from the contract low of $238,296 to a $298,740, with completion scheduled at 300 days, and minimum hourly wages stipulated of $1.50 for skilled and 30c. for common labor.

LOW BIDDERS:

1. Smith-Pew Construction Co., Atlanta, (contract)	$238,296
2. W. L. Cobb Construction Co., Atlanta	246,700
3. A. H. Guion & Co., Atlanta	247,429

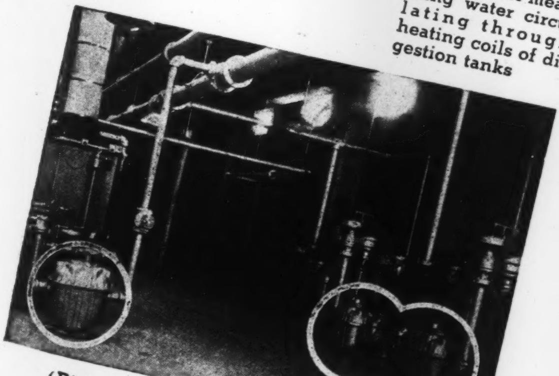
Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excav. earth	62,000 c. y.	$0.40	$0.35	$0.28
2. Excav. rock	6,400 c. y	.90	1.60	1.40
3. Cl. 150 ci.b.s. pipe, 6 in.	768 l. f.	.773	.70	.75
4. C.i.b.s. pipe, cl. A, 8 in.	32 l. f.	1.08	1.00	1.05
5. C.i.b.s. pipe, cl. A, 10 in.	720 l. f.	1.44	1.30	1.40
6. Flg. c.i. pipe, cl. A, 10 in.	17 l. f.	2.16	2.00	2.00
7. C.i.b.s. pipe, cl. A, 24 in.	696 l. f.	4.87	4.60	4.73
8. C.i.b.s. pipe cl. A, 48 in.	372 l. f.	17.10	15.00	16.60
9. Specials c.i.b.s.	40 ton	125.66	115.00	122.00
10. Set c.i.b.s. pipe, cl. 150, 6 in.	798 l. f.	.40	.50	.30
11. Set c.i.b.s. pipe, cl. A, 8 in.	32 l. f.	.50	.50	.40
12. Set c.i.b.s. pipe, cl. A, 10 in.	714 l. f.	.78	.60	.35
13. Set flg., c.i. pipe, cl. A, 10 in.	17 l. f.	.80	.60	.50
14. Set c.i.b.s. pipe, cl. A, 24 in.	722 l. f.	1.60	1.60	.90
15. Set c.i.b.s. pipe, cl. A, 48 in.	438 l. f.	4.50	3.50	1.80
16. Cone valves, 30 in.	2 ea.	2,600.00	2,400.00	2,400.00
17. Gate valves, cl. C.h.e., 6 in.	1 ea.	28.80	27.00	28.00
18. Gate valves, cl. A.f.f., 10 in.	4 ea.	56.53	60.00	55.00
19. Gate valves, cl. A.h.e., 24 in.	2 ea.	300.00	330.00	300.00
20. Gate valves, cl. A.h.e., 48 in.	1 ea.	1,663.00	1,750.00	1,600.00
21. Hydrants	9 ea.	52.00	50.00	52.00
22. Sluice gates, 60 in.	2 ea.	911.00	900.00	825.00
23. Sluice gates, 20 in.	8 ea.	169.00	165.00	150.00
24. Haul, install c.i. pipe, 30 in.	787 l. f.	2.90	2.50	4.00
25. Lay conc. sewer pipe, 30 in.	200 l. f.	4,84	6.50	4.00
26. Manholes complete	7 ea.	120.00	100.00	100.00
27. Storm drain sewer pipe, 8 in.	618 l. f.	.60	1.00	.65
28. Storm drain sewer pipe, 12 in.	787 l. f.	1.00	1.60	.95
29. Sub-drains, 8 in.	2,966 l. f.	1.00	1.00	.70
30. Catch basins	L. S.	362.70	2,966.00	2,076.20
31. Excav. rock, trenches	1,032 c. y.	2.50	5.00	5.00
32. Conc. backfill, cl. C	792 c. y.	8.00	16.00	8.50
33. Comp. flocc. equip.	L.S.	19,800.00	18,000.00	17,800.00
34. Comp. clarifier equip.	L.S.	17,700.00	14,000.00	14,000.00
35. Comp. outlet weirs	L.S.	3,800.00	9,000.00	3,900.00
36. Elec. power wiring, 220 v.	L.S.	1,455.00	2,000.00	1,400.00
37. Lighting and wiring	L.S.	3,060.00	3,500.00	3,000.00
38. Fencing	L.S.	530.00	400.00	500.00
39. Concrete, excess or less	c. y.	12.00	17.00	12.00
40. Forms, excess or less	s. f.	.16	.15	.14
41. Reinf. steel, excess or less.	lb.	.06	.03½	.04
42. Gunite baffles, longitudinal	6,355 s. f.	.78	.70	.79
43. Gunite baffles, transverse.	3,704 s. f.	.78	.70	.79

. . Especially Designed for SEWAGE DISPOSAL PLANTS



Nordstrom Lubricated Plug Valves handling concentrated sewage sludge

Pittsburgh Hot Water Meter measuring water circulating through heating coils of digestion tanks



(Right) EMCO Gas Meters measuring sewage gas from digestion tanks, (Left) measuring gas consumed by hot water boiler

EMCO SEWAGE GAS METERS

Measure the entire flow from each digestion tank.

Measure gas used by burners or gas engines.

Measure the amount of gas wasted.

PITTSBURGH HOT & COLD WATER METERS

Measure heated water circulated through digestion tanks.

Measure cold water for various uses about the disposal plant.

NORDSTROM LUBRICATED PLUG VALVES

Lateral Air Lines

Sludge Lines

Grit Chamber Drain Lines

Pump suction and discharge lines handling sludge or gritty material.

Meter and valve services in sewage treatment plants are particularly severe due to the highly corrosive and abrasive character of the substances handled. That's why Consulting Engineers are specifying especially constructed EMCO Gas Meters, Pittsburgh Water Meters and Nordstrom Lubricated Plug Valves.

The proper foresight in installing the proper meter and valve for each service, prior to starting new construction, will more than be repaid later in freedom from operating difficulties, repairs and costly replacements.

Write for bulletin giving complete information.

PITTSBURGH EQUITABLE METER CO.
MERCO NORDSTROM VALVE CO.

MAIN OFFICES PITTSBURGH, PA.

ATLANTA BUFFALO CHICAGO MEMPHIS
NEW YORK COLUMBIA KANSAS CITY PHILADELPHIA TULSA HOUSTON LOS ANGELES OAKLAND

UNIT BID PRICES—SEWERS

SEWERS, GREAT BEND, KANS.

OWNER: City of Great Bend, Kan.; Paulette & Wilson, Topeka, Engineers.

PROJECT: Construction of 4 miles of sanitary sewer, 8 to 21 in. diameter, in Great Bend, Kan.

BIDS: Eight bids were opened in August, 1937, with alternative proposals submitted for vitrified clay, and reinf. concrete pipe. Bids ranged from a low of $36,110 for vitrified clay pipe, and $37,437 for reinforced concrete pipe to respective highs of $46,599 and $48,642. Contract was awarded at $37,331 based on the use of 8 and 10 in. clay pipe and 12, 15, 18 and 21 in. reinf. concrete pipe.

LOW BIDDERS:

1. Stamey & Tidd, Hutchinson, Kan.	
Vitrified clay pipe	$36,110
Reinforced concrete pipe	37,437
8 and 10 in. clay; bal. conc. (contract)	37,331
2. W. B. Carter, Wichita, Kan.	
Vitrified clay pipe	37,180
Reinforced concrete pipe	38,805
8 and 10 in. clay; bal. concrete	38,745
3. P. P. Young, St. Joseph, Mo.	
Vitrified clay pipe	38,221
Reinforced concrete pipe	37,471
8 and 10 in. clay; bal. concrete	37,915

Item	Quan.	Unit Prices		
		(1)	(2)	(3)
1. Trenching, 4 ft.–6 ft.	15,930 l. f.	$0.24	$0.18	$0.15
2. Trenching, 6 ft.–8 ft.	6,390 l. f.	.27	.24	.18
3. Trenching, 8 ft.–10 ft.	800 l. f.	.41	.50	.245
4. Trenching, 10 ft.–12 ft.	500 l. f.	.43	1.00	.40
5. Trenching, 12 ft.–14 ft.	...... l. f.	.60	1.50	.65
6. V. c. pipe, 8 in.	10,850 l. f.	.39	.43	.50
7. V. c. pipe, 10 in.	325 l. f.	.56	.65	.65
8. V. c. pipe, 12 in.	1,860 l. f.	.73	.84	.84
9. V. c. pipe, 15 in.	3,357 l. f.	1.10	1.18	1.27
10. V. c. pipe, 18 in.	4,387 l. f.	1.55	1.65	1.72
11. V. c. pipe, 21 in.	2,721 l. f.	2.10	2.25	2.33
12. V. c. wyes, 8x6 in.	300 ea.	.70	.70	.80
13. V. c. wyes, 12x6 in.	60 ea.	1.30	1.20	1.25
14. V. c. wyes, 15x6 in.	75 ea.	1.63	1.75	2.00
15. V. c. wyes, 18x6 in.	86 ea.	2.22	2.75	2.50
16. V. c. wyes, 21x6 in.	...... ea.	4.00	3.50	3.40
17. P. c. pipe, 8 in.	10,850 l. f.	.39	.43	.46
18. R. c. pipe, 10 in.	325 l. f.	.50	.65	.62
19. R. c. pipe, 12 in.	1,860 l. f.	.88	1.00	.84
20. R. c. pipe, 15 in.	3,357 l. f.	1.31	1.35	1.27
21. R. c. pipe, 18 in.	4,387 l. f.	1.62	1.75	1.70
22. R. c. pipe, 21 in.	2,721 l. f.	2.10	2.35	2.25
23. P. c. wyes, 8x6 in.	300 ea.	1.12	0.90	0.80
24. R. c. wyes, 12x6 in.	60 ea.	1.20	1.50	1.25
25. R. c. wyes, 15x6 in.	75 ea.	1.25	2.00	1.90
26. R. c. wyes, 18x6 in.	86 ea.	1.80	2.25	2.50
27. R. c. wyes, 21x6 in.	...... ea.	3.00	3.75	3.40
28. C. i. pipe, 18 in.	104 l. f.	8.15	6.00	8.25
29. C. i. pipe, 20 in.	16 l. f.	10.00	7.00	9.50
30. Shallow brick manholes	15 ea.	40.00	42.00	47.00
31. Brick manholes	41 ea.	40.00	42.00	47.00
32. Variation, manhole depths	50 l. f.	5.00	5.00	5.75
33. Brick flush tanks	17 ea.	70.00	80.00	88.00
34. Variation, flush tank depths	10 l. f.	6.00	6.00	5.75
35. Shallow flush tanks	1 ea.	70.00	80.00	86.00
36. Lampholes	1 ea.	5.00	7.00	7.50
37. Supply lines, copper, ½-in.	3,300 l. f.	.30	.25	.20
38. Regulator, stop cock	18 set	6.00	6.00	7.00
39. Corporation	5 ea.	4.00	3.00	2.50
40. Remove, replace bit. pavt.	10 s. y.	2.50	3.00	1.00
41. Remove, replace brick pavt	33 s. y.	2.25	5.00	4.00
42. Concrete, Cl. 3	100 c. y.	10.00	10.00	13.00
43. Reinf. steel	8,000 lb.	.05	.06	.055

N. Y. SEWAGE DISPOSAL PLANT

OWNER: City of New York, Department of Sanitation; Deputy Commissioner, W. D. Binger in charge of engineering; R. H. Gould, engineer in charge of sewage disposal and interceptors.

PROJECT: Tallman's Island sewage disposal plant, located on mainland 1½ miles east of Flushing Bay on north shore of Long Island. Contract 2 for sedimentation, aeration and digestion tanks with appurtenant structures, and Contract 4 for gas-engine driven pumping units and blowers, as tabulated below, are two of eight contracts for complete new activated sludge treatment plant. Contract 1, $334,780 for bulkhead, pier and dredging a channel to deep water has been completed by J. Rich Steers Co. The remaining contracts for pump and blower house, plumbing, heating, etc., are yet to be let.

CONDITIONS: Site is on Long Island Sound, accessible by land and water, and is of natural ground; probably one fifth of excavation will be wet. Time limit for both contracts is one year. New York City union labor conditions will prevail.

BIDS: Seven proposals submitted for Contract 1, ranging from $1,303,063 to $1,708,609. Award made to low bidder on June 22, 1937. Only one bid received for Contract 4, award made to lone bidder June 22.

LOW BIDDERS: Contract 2.

1. North-Eastern Const. Co., New York City (contract)	$1,303,064
2. Rosoff Bros., Inc., Brooklyn, N. Y.	1,485,831
3. Turner Const. Co., New York City	1,491,794
Contract 4: Worthington Pump & Mach. Corp., New York City (contract)	469,000

Item	Quan.	Unit Prices		
		(1)	(2)	(3)
1. Earth excav., above El. 0.0	75,000 c.y.	$0.39	$0.40	$0.35
2. Earth excav., below El. 0.0	19,000 c.y.	3.20	5.00	1.55
3. Earth excav., trench	16,700 c.y.	2.40	3.00	1.90
4. Remove, store topsoil	2,000 c.y.	.35	.50	.50
5. Redistribute topsoil	4,000 c.y.	.70	.40	.50
6. Rock excav.	500 c.y.	9.00	3.00	8.40
7. Timber sheeting, left in place	110 M.b.m.	23.00	30.00	30.00
8. Portland cement	36,000 bbl.	2.20	2.50	3.10
9. Concrete, class A	24,200 c.y.	14.30	16.50	14.85
10. Concrete, class B	800 c.y.	4.80	15.00	8.05
11. Rubbed finish	82,000 s.f.	.08	.08	.16
12. Concrete floor hardener	30,000 s.f.	.02	.02	.03
13. Waterproofing concrete	34,000 s.f.	.025	.10	.055
14. Reinf. steel	3,500,000 lb.	.055	.0575	.05
15. C. I. pipe, b. & s.	1,420,000 lb.	.0512	.07	.09
16. C. I. pipe fittings, b. & s.	140,000 lb.	.098	.07	.145
17. C. I. pipe specials, b. & s.	70,000 lb.	.132	.20	.185
18. C. I. pipe flanged, 6–12 ft. lgths.	80,000 lb.	.061	.15	.105
19. C. I. pipe flanged, 3–6 ft. lgths	20,000 lb.	.072	.15	.12
20. C. I. pipe flanged, 1–3 ft. lgths	20,000 lb.	.104	.25	.16
21. C. I. pipe fittings, flanged	60,000 lb.	.103	.25	.16
22. C. I. pipe specials, flanged	10,000 lb.	.151	.50	.30
23. Pipe expansion couplings	29,000 lb.	.126	.20	.35
24. Flexible connections	L. S.	790.00	1,000.00	1,540.00
25. Ground water relief valves	144 ea.	75.00	100.00	54.00
26. Valves and sluice gates	L. S.	35,775.00	39,000.00	57,600.00
27. Venturi meters, registers	L. S.	27,820.00	40,000.00	45,000.00
28. Stop planks and baffles	15,000 f.b.m.	.14	.20	.155
29. Misc. wrought iron, plain	140,000 lb.	.18	.13	.185
30. Misc. wrought iron, galv.	11,000 lb.	.22	.17	.225
31. Misc. wrought aluminum	17,000 lb.	.90	.90	.90
32. Misc. wrought bronze	600 lb.	1.50	.55	1.50
33. Misc. iron castings, plain	31,000 lb.	.17	.08	.12
34. Misc. iron castings, galv.	1,000 lb.	.20	.12	.305
35. Misc. aluminum castings	200 lb.	2.00	2.00	2.10
36. Misc. bronze castings	200 lb.	1.25	2.00	1.55
37. Copper exp. joint	8,000 lb.	.45	.30	.39
38. Sheet exp. joint, ½ in.	4,000 s.f.	.40	.28	.46
39. Sheet exp. joint, ¾ in.	10,000 s.f.	.41	.38	.59
40. Structural steel	60,000 lb.	.063	.06	.08
41. Precast conc. diffuser pl. boxes, 18-plate	286 ea.	75.00	60.00	82.00
42. Ditto, 10-plate	31 ea.	40.00	30.00	44.00
43. Ditto, 8-plate	20 ea.	35.00	28.50	44.00
44. Precast conc. filler blocks	3,000 l.f.	1.60	1.00	1.35
45. Precast conc. walk slabs	10,600 s.f.	.65	.36	.55
46. Diffuser plates	5,600 ea.	2.35	1.75	3.60
47. Floor, roof drain system	L. S.	5,400.00	6,000.00	4,200.00
48. Sludge, sump and lime pumps	L. S.	12,700.00	15,000.00	15,800.00
49. Air lifts	L. S.	6,100.00	5,600.00	7,450.00
50. Sludge, scum removal mech.	L. S.	91,825.00	97,550.00	132,000.00
51. Dry chemical feed mech.	L. S.	4,100.00	2,800.00	3,750.00
52. Chlorinators	L. S.	11,800.00	12,000.00	13,000.00
53. Instal sludge thickener mech.	L. S.	480.00	900.00	630.00
54. Instal digester tank covers	L. S.	28,500.00	23,000.00	35,300.00
55. Hydrants	12 ea.	85.00	100.00	155.00
56. Elec. conduits, steel	15,000 l.f.	.37	.33	.46
57. Elec. conduits, copper	1,500 l.f.	1.25	1.10	1.10
58. Elec. conduits exp. joint	400 ea.	3.00	2.65	1.90
59. Elec. conduit motor conn.	L. S.	850.00	750.00	1,180.00
60. Floor grating, 1 in.	3,600 s.f.	1.30	1.30	1.65
61. Floor grating, 1¼ in.	1,560 s.f.	1.60	1.50	1.95
62. Floor grating, 1½ in.	200 s.f.	1.80	1.75	2.25
63. Rails for tanks	8,000 l.f.	.40	.35	.32
64. Gravel or broken stone	100 c.y.	3.00	3.00	4.20
65. Concrete piles	6,000 l.f.	2.50	2.25	3.00
66. Vit. pipe drain, 30 in.	825 l.f.	10.75	10.00	11.10
67. Vit. pipe drain, 24 in.	810 l.f.	4.80	8.00	4.60
68. Vit. pipe drain, 20 in.	150 l.f.	2.60	7.00	6.00
69. Vit. pipe drain, 15 in.	140 l.f.	1.70	5.00	4.55
70. Vit. pipe drain, 4 in.	150 l.f.	.70	.50	.70
71. Manholes	L. S.	5,100.00	3,500.00	6,550.00
72. Reinf. conc. effluent pipe	700 l.f.	16.25	30.00	19.00

UNIT BID PRICES—SEWERS

SEWERS, ST. LOUIS, MO.

OWNER: St. Louis Board of Public Service; L. A. Pettus, City Engineer.

PROJECT: Construction of 2,000 ft. of 12 to 54-in. vitrified tile sewer in open cut and 1,450 ft. of 54-in. sewer in tunnel, with paving and street repairs, comprising Section 3E, Southern-Arsenal Public Relief Sewers, in south central St. Louis.

BIDS: Eight bids ranging from the contract low of $65,236 to a high of $105,285, were opened June, 1937, with completion scheduled for 23 weeks after contract award, minimum hourly wages stipulated of $1.50 for skilled and 70c for common labor. All materials required for the construction to be furnished by the contractor.

LOW BIDDERS:

1. Walsh & Wells, Inc., St. Louis, Mo. (contract)	$65,236
2. Samuel Kraus Co., St. Louis, Mo..........	67,812
3. Stiers Bros. Const. Co., St. Louis, Mo......	72,523

Item	Quan.	Unit Prices		
		(1)	(2)	(3)
1. Excavation, Cl. A......	420c. y.	$10.00	$6.00	$6.00
2. Excavation, Cl. B......	400 c. y.	2.30	2.00	2.60
3. Excavation, Cl. C......	2,400 c. y.	1.15	1.00	1.40
4. Granular fill..........	2,000 c. y.	1.00	1.50	.80
5. Brick, m.h., inlet......	1,680 c. f.	1.00	1.10	1.00
6. Concrete, Cl. A.........	50 c. f.	.50	.50	.80
7. Concrete, Cl. B.........	100 c. f.	.40	.46	.60
8. Concrete, Cl. C.........	100 c. f	.35	.45	.40
9. Vit. tile sewer, complete, 12 in................	200 l. f.	.80	1.10	.80
10. Vit. tile sewer complete, 15 in................	120 l. f	1.25	1.30	1.25
11. Vit. tile sewer complete, 18 in................	460 l. f	1.75	1.75	1.70
12. Vit. tile sewer, complete, 21 in................	200 l. f.	2.20	2.25	2.15
13. Vit. tile sewer complete, 27 in................	490 l. f.	3.25	3.50	3.30
14. Vit. tile sewer complete, 33 in................	330 l. f.	4.00	6.00	4.50
15. Vit. tile sewer complete, 36 in................	115 l. f.	5.00	6.25	4.75
16. Vit. tile sewer complete, 54 in................	260 l. f.	8.00	8 75	7.75
17. Transition, 2½ x 3½ ft.....	7 l. f.	6 00	15.00	25.00
18. Junc. Y. 12 in. pipe......	12 each	2.50	5.00	5.00
19. Junc. Y, 15 in. pipe......	1 each	4.00	10.00	7.50
20. Junc. Y, 18 in. pipe.....	1 each	5.00	12 50	10.00
21 Rebuild old inlets......	5 each	20.00	10.00	50.00
22. Inlet pipe conn..........	19 each	10.00	10.00	10.00
23. Unit stones, sills, etc.....	2 set	10.00	10.00	10.00
24. Cast iron...............	10,340 lb.	.05	.05	.05
25. Steel spec. inlets........	1,010 lb.	.05	.10	.10
26. Trench lumber..........	25 M.b.m.	30.00	30.00	30.00
27. Remove curb for new inlets	2 each	5.00	5.00	10.00
28. Remove bit. pavem't....	300 s. y.	.50	.75	.50
29. Remove brick surf......	23 s. y.	1.00	.75	.50
30. Remove conc. base, pavements................	325 s. y.	1.00	1.00	1.00
31. Remove conc. gutter....	60 s. f.	.10	.30	.25
32. Conc. pave. base........	600 s. y.	2.00	2.25	2.00
33. Asph. surf., binder course.	295 s. y.	3.00	3.00	3.00
34. Brick surf., bed course....	16 s. y.	2.50	3.00	3.00
35. Conc. gutter............	60 s. f.	.25	.50	.50
36. One course asph. conc. surf.	280 s. y.	1.00	3.00	1.00
37. Remove conc. sidewalks..	180 s. f.	.05	.10	.10
38. Restore conc. sidewalks...	180 s. f.	.25	.30	.40
39. Cure concrete...........	350 s. y.	.05	.05	10
40. Junct. chamber, complete.	1 l. s.	500.00	400.00	500.00
	TUNNEL			
41. Completed sewer, 54 in...	1,455 l. f.	27.63	28.56	33.00
42. Excav. Cl. A............	150 c. y.	6.00	6.00	6.00
43. Excav. Cl. B............	300 c. y.	1.00	1.00	1.00

INTERCEPTING SEWER, NEW YORK

OWNER: City of New York; Department of Sanitation; W. D. Binger, deputy commissioner in charge of engineering; R. H. Gould, chief engineer of sewage disposal.

PROJECT: Ditmars Blvd. intercepting sewer, 5,000 ft. long, an addition to the existing system of sewers serving North Beach screening plant in Queens. It will collect flow from existing sewers now discharging into west side of Flushing Bay, and will be a link in extensive future improvements.

CONDITIONS: Contract time, six months. Average depth of cut 15 ft., maximum 40 ft. About 60 per cent of excavation expected to be wet enough to require pumping. Little cutting and replacement of paving, as sewer mostly traverses unpaved streets.

BIDS: Seven bids were received July 9, range $304,584 to $455,942. Contract awarded Aug. 11.

LOW BIDDERS:

1. Arthur A. Johnson-Necaro Co., Inc., New York (contract)	$304,584
2. Nicholas Di Menna & Sons, Inc., New York..	311,036
3. Slattery Contr. Co., Inc., and Di Salvo Contr. Co., New York	365,648

Item	Quan.	Unit Prices		
		(1)	(2)	(3)
1. Reinf. conc. sewer, 10x9 ft..	1,550 l. f.	$65.00	$59.10	$70.00
2. Reinf. conc. sewer, 8.25x9 ft.	132 l. f.	58.00	56.20	67.00
3. Reinf. conc. sewer, 7.75x9 ft. on piles................	613 l. f.	50 00	47.25	55.00
4. Reinf. conc. sewer, 5.5x9 ft. on piles................	243 l. f.	34.00	36.25	48 00
5. Reinf. conc. sewer, 5.5x9 ft.	433 l. f.	46.00	42.80	50.00
6. Reinf. conc. sewer, 5.5x7 ft. on piles................	745 l. f.	32.00	33.35	44.00
7. Reinf. conc. sewer, 5.5x7 ft.	883 l. f.	54.00	78.35	75.00
8. Chamber A.............	L. S.	3,214.00	3,410.00	2,660.00
9. Chamber B.............	L. S.	3.613.00	3,958.00	3.490 00
10. Chamber C on piles......	L. S.	3,032.00	3.418.00	2,030.00
11. Chamber D on piles......	L. S.	2,508.00	1.744.00	1,620.00
12. Chamber E............	L. S.	2,953.00	1.725.00	2,680.00
13. Chamber F............	L. S.	2,953.00	1,769.00	2,880.00
14. Manholes, Type C.......	200 v. f.	19.00	13.50	28.00
15. Manholes, Type F.......	250 v. f.	26.00	17.00	30.00
16. Culvert................	L. S.	4,522.00	3,334.50	7,270.00
17. Alt. 82nd St. weir chamber	L. S.	2,556.00	1,250.00	2,910.00
18. Alt. 22nd Rd. weir chamber	L. S.	2,094.00	400.00	1,910.00
19. Spurs, c.b. and house conn..	160 ea.	4.50	10.00	8.00
20. Risers................	92 v. f.	3.50	5.00	5.00
21. Foundation timber........	70 Mfbm.	119.00	110.00	150.00
22. Wood piles.............	27,000 l. f.	.65	.70	.60
23. Broken stone ballast....	10 c. y.	4.50	5.00	3.00
24. Timb. shtg. left in place....	410 Mfbm.	.01	10.00	30.00
25. Excav., rock, old masonry..	10 c. y.	5.00	5.00	5.00
26. Add. fill for embankment.	400 c. y.	1.00	.50	.50
27. Add. earth excav. above El. O,O	50 c. y.	1.00	1.00	.60
28. Add. earth excav. below El. O,O	50 c. y.	2.00	3.00	2.00
29. Add. concrete, cl. A.....	10 c. y.	15.00	10.00	15.00
30. Add. steel reinf. bars....	6,000 lb.	.06	.06	.07

OUTFALL SEWER, BUFFALO

OWNER: Buffalo Sewer Authority, Buffalo, N. Y.; Greeley & Hansen, Engineers.

PROJECT: Construction of outfall conduit and overflow structure in Niagara River on west side of Bird Island, as part of Buffalo, N. Y., intercepting sewer and sewage treatment project.

BIDS: Four bids were opened in August, 1937, ranging from contract low of $110,320 to $191,040, both extremes based on steel outfall construction. Alternatives submitted on concrete outfall structure ranged from $113,603 to $136,743.

LOW BIDDERS:

1. McLain Construction Corporation, Buffalo, N. Y. (steel) (contract)	$110,320
2. Great Lakes & Dock Co., Buffalo, N. Y. (concrete)	113,603
3. L. A. Wells Construction Co., Cleveland, Ohio (concrete)	136,743

Item	Quan.	Unit Prices		
		(1)	(2)	(3)
1. Outfall structure alternatives				
(Steel construction....	L. S.	$100,190.00	....	....
(Concrete construction)	0 L. S.	....	$102,989.00	$119,000.00
2. Earth excav. add. dry.	200 c. y.	2.00	0.95	7.90
3. Earth excav. add. wet.	500 c. y.	3.50	1.00	7.90
4. Rock excav., dry.....	20 c. y.	8.00	1.00	7.90
5. Concrete, Cl. A-1.....	20 c. y.	20.00	32.00	25.00
6. Rock excavation, wet..	100 c. y.	10.00	1.00	7.90
7. Concrete, Cl. A-2.....	30 c. y.	11.00	25.00	23.00
8. Concrete, Cl. B.......	50 c. y.	10.00	13.00	20.00
9. Reinf. steel..........	5,000 lb.	.04	.08	.04
10. Wood sheeting.......	2 M.b.m.	20.00	163.00	75.00
11. Steel sheeting........	25,000 lb.	.05	.02	.02
12. Fill, selected.........	100 c. y.	1.00	1.50	1.00
13. Concrete in bags......	250 c. y.	16.90	25.55	32.50

UNIT BID PRICES—TUNNELS

PIPE TUNNEL, MILWAUKEE

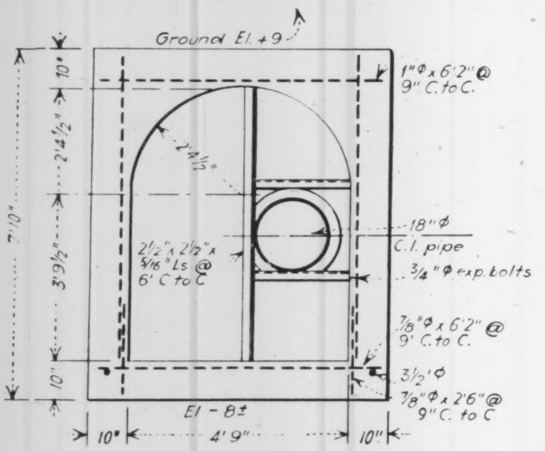
OWNER: Sewerage Commission of Milwaukee, Wisc., J. L. Ferebee, chief engineer.

PROJECT: Concrete-lined tunnel 270 ft. long, 4 ft. 9 in. wide, 6 ft. 10 in. high, inside dimensions, semi-circular arch, walls 10 in. thick of reinforced concrete. Tunnel to carry 18-in. cast iron sludge pipe, installed by contractor; project includes constructing waste sludge pipe line with valves and gates.

CONDITIONS: Located on Jones Island, Milwaukee. Tunnel to be driven through sand by poling board method about 400 ft. from river and below water level. Pumping will be required. Stipulated contract time four months. Typical wage rates: operator, $1.65; miner, form setter, $1.50; mucker, reinf. setter, $1.50; concrete laborer, 85c.

BIDS: Four bids submitted on July 8, 1937; range $33,470 to $49,500. Proposals were taken on lump sum basis, but after award of contract, successful bidder was required to submit a breakdown of expected costs to the Commission. Following is the breakdown submitted by F. A. Goll, Milwaukee, to whom the contract was awarded on July 15 for $33,470.

Item	Quan.	Unit Cost	Labor	Mat'l
1. Tunnel mining	270 l. f.	$30.00	$8,100	......
2. Concrete placing	270 l. f.	8.00	2,160	......
3. Laying pipe	500 l. f.	6.00	3,000	......
4. Breaking concrete wall	......	......	2,000	......
5. Open cut excavation	50 l. f.	40.00	2,000	......
6. Shaft lumber	......	......	......	$360
7. Tunnel lumber	240 l. f.	5.00	......	1,200
8. Concrete forms	270 l. f.	1.00	......	270
9. Reinf. steel	25,000 lb.	......	......	760
10. Cast iron pipe	36.5 ton	......	......	2,800
11. Lead and hemp	......	......	......	300
12. Pipe supports	......	......	......	500
13. Gate valves, sluice gates	......	......	......	1,000
14. Concrete materials	500 c. y.	8.00	......	4,000
15. Misc. & Overhead	......	......	......	4,020
Total costs	......	......	$17,260	$16,210



TYPICAL TUNNEL CROSS SECTION

TUNNEL LINING, OREGON

OWNER: U. S. Engineers, Bonneville Project; Major Theron D. Weaver, Engineer.

PROJECT: Permanent lining for Ruckel Slide drainage tunnels, between Bonneville and Cascades Locks, Bonneville, Ore.

BIDS: Four bids were opened in August, 1937, ranging from a low of $43,763 to a high of $94,447, based on minimum hourly wage rates stipulated at $1.20 for skilled and 55c. for common labor.

LOW BIDDERS:

1. Sam Orino, Bonneville, Ore.	$43,763
2. Guthrie-McDougall Co., Portland, Ore.	70,854
3. Parker-Schramm Co., Portland, Ore.	80,855

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation	240 c. y.	$12.00	$12.00	$4
2. Creosoted timber	425 M.b.m.	85.00	147.00	175
3. Corr. iron outlet, 30 in.	376 l. f.	4.00	3.50	3
4. Corr. iron outlet, 36 in.	32 l. f.	6.00	5.00	4
5. Timber backfill	52 M.b.m.	26.00	30.00	40
6. Outlet pipe backfill	360 c. y.	3.50	5.75	3
7. Shaft lining	45 l. f.	10.00	8.75	20

SHIELD TUNNEL, DETROIT

OWNER: Department of Public Works, Detroit; L. G. Lenhardt, Commissioner.

PROJECT: Driving of 5,622 ft. of intercepting sewer tunnel, 12.75 ft. inside diameter, by the shield method and building a 208-ft. section by open cut for Oakwood Interceptor from sewage plant grit chambers to Lonyo Outlet Sewer; last link in $22,000,000 intercepting sewer and treatment works project. The tunnel walls are two-pieces: primary lining of 16-in. precast blocks, secondary lining of 16-in. monolithic concrete.

CONDITIONS: Soft blue clay entire length. Two open-cut sections required at short radius turns impossible to drive by shield. Completion scheduled for June, 1938. PWA labor regulations govern. Minimum wages stipulated for every class of labor; varies from 75c. for common labor to $1.55 for skilled; most skilled trades listed at $1.50; muckers at $1.05 and miners at $1.30.

BIDS: Two bids only were submitted at opening in July, 1937. Contract was awarded to low bidder.

BIDDERS:

1. S. A. Healy Co., Chicago (contract)	$ 849,482
2. Blanck & Gargaro Co., Inc., Detroit	1,164,963

Item	Quan.	Unit Prices (1)	(2)
1. Tunnel sewer, 12.75 ft	5,622 l. f.	$131.00	$170.00
2. Open cut sewer, Flora-Reisener	l. s.	40,000.00	72,500.00
3. Open cut sewer, Flora-Forman	l. s.	38,000.00	65,500.00
4. Open cut sewer, Miller-Fort	50 l. f.	240.00	892.00
5. Standard manholes	9 ea.	200.00	500.00
6. V. c. sewer lining	25 l. f.	35.00	52.50
7. Opening, 6 ft	l. s.	250.00	200.00
8. Bulkhead, grit chamber	l. s.	500.00	300.00
9. Bulkhead, regulator chamber	l. s.	500.00	300.00
10. Install, remove compressor plant	l. s.	5,000.00	5,000.00
11. Build, remove air locks	3 ea.	1,500.00	2,900.00
12. Engineer's field office	l. s.	5,000.00	5,500.00
13. Test cores	31 ea.	75.00	60.00
14. Alignment holes	250 l. f.	7.00	5.00
15. Regulator connection	2 ea.	250.00	200.00

DELAWARE WATER TUNNEL, N. Y.

OWNER: Board of Water Supply, New York City, W. E. Spear, chief engineer.

PROJECT: Three contracts, 322, 323, and 324 for sections of Delaware River aqueduct tunnel in Putnam and Westchester counties, aggregating 20 miles in length. Tunnel section is 15 ft. circular diameter, 10 in., minimum concrete lining. Each contract section includes two shafts of varying diameters and depths. Much of ground will require steel timbering. Contract time: contract 322, 60 months; contract 323, 66 months; contract 324, 58 months; contract bond; each section, $1,200,000. Tunnel length and shaft depth: contract 322, 33,400 ft.; shaft 11, 310 ft. (offset, requires 600 ft. of 12-ft. drift); shaft 12, 356 ft.; contract 323, 30,600 ft.; shaft 13, 375 ft.; shaft 14, 560 ft.; contract 324, 37,100 ft.; shaft 15, 530 ft.; shaft 16, 390 ft.; shafts mostly in rock.

UNIT BID PRICES—TUNNELS

CONDITIONS: Bids were originally opened Nov. 9, 1937. At that time a protest arose over the high rate certified as "prevailing" by state and city authorities and stipulated as minimum in the contracts. After considerable controversy, the November bids were rejected and the work re-advertised with minimum rates set much lower than formerly. (See ENR, Feb. 17, 1938, p. 250 for a list of old and new rates.) Rates were originally listed ranging from unskilled at 80 cents to most skilled trades at $2.125. The more recent rates range from 65 cents to $1.75. All shafts are easily accessible.

BIDS: Proposals opened March 24, 1938. Seven bids received for contract 322, $10,829,530 to $12,139,455; four for contract 323, ranging from $10,810,166 to $13,142,325; six for contact 324, $10,870,238 to $13,268,620. In general bids showed only a slight reduction from the figures submitted last November.

LOW BIDDERS: Three low bidders given at head of unit price tabulations.

CONTRACT 322

1. The Utah Construction Co., Ogden	$10,829,530
2. Silas Mason Co., Inc., New York	11,445,170
3. Pacific Constructors, Inc., Los Angeles	11,552,910

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Test boring	2,500 l. f.	$5.00	$7.00	$6.25
2. Sink shaft in earth	1,000 c. y.	15.00	12.50	30.00
3. Sink shafts in rock	8,000 c. y.	35.00	35.00	30.00
4. Excav. tunnel	390,000 c. y.	13.00	14.50	15.50
5. Enlarge. shafts, tunnel, drift	7,500 c. y.	13.00	10.00	15.50
6. Cement mortar coatings	1,000 c. y.	16.00	30.00	20.00
7. Steel ground support	5,500,000 lb.	.09	.075	.07
8. Timbering	1,000 M.b.m.	110.00	120.00	105.00
9. Dry packing	4,500 c. v.	7.00	6.00	7.50
10. Pumping	300,000 Mill.f.g.	.14	.35	.35
11. Drainage channels	35,000 l. f.	12.00	7.00	7.50
12. Steel lining, risers	220,000 lb.	.14	.10	.17
13. Outer masonry forms, shaft	600 l. f.	50.00	50.00	45.00
14. Forms, lining steel risers	500 l. f.	14.00	8.00	15.00
15. Lining forms, tunnel	34,200 l. f.	5.00	5.00	15.00
16. Conc. masonry, shafts	5,500 c. y.	30.00	25.00	15.35
17. Conc. masonry, tunnel	163,000 c. y.	10.30	10.00	10.00
18. Excess conc. masonry	17,000 c. y.	5.00	5.00	5.00
19. Bit. solvent	140,000 s. y.	.10	.15	.09
20. Drill, rock or masonry	40,000 l. f.	.90	1.00	.75
21. Steel grout pipes	30,000 l. f.	.75	1.00	.95
22. Making conn. grout	8,500 ea.	7.00	4.00	3.00
23. Sand for filter, grout and mortar coatings	5,500 c. y.	3.50	5.00	5.00
24. Mix, place grout	18,000 c. y.	14.00	20.00	13.50
25. Remove soil	55,000 c. y.	1.00	1.50	1.00
26. Earth excav. open cut	36,000 c. y.	1.00	2.00	1.00
27. Rock excav. open cut	2,500 c. y.	4.00	8.00	5.00
28. Refill embank	60,000 c. y.	.75	.75	.50
29. Dress, grass surf	40,000 c. y.	1.00	1.00	.75
30. Timber, open cut	150 M.b.m.	100.00	120.00	125.00
31. Conc. masonry, open cut	3,000 c. y.	29.00	15.00	20.00
32. Granolithic finish	700 s. y.	1.65	1.35	2.00
33. Vit. pipes	2,500 l. f.	1.00	1.00	1.50
34. Dry rubble paving	100 c. y.	12.00	11.00	10.00
35. Rubble masonry paving	100 c. y.	15.00	14.00	17.50
36. Crushed stone, gravel	225 c. y.	5.00	5.00	6.00
37. Portland cement	453,000 bbl.	2.20	2.50	1.90
38. Reinf. steel	540,000 lb.	.06	.075	.05
39. Struct. steel	290,000 lb.	.09	.08	.06
40. Steel sheet piling	475,000 lb.	.08	.06	.10
41. Misc. iron	85,000 lb.	.16	.20	.20
42. Galvanizing	40,000 lb.	.06	.04	.05
43. Misc. bronze, etc	3,000 lb.	.50	.80	1.00
44. Set. equip. furn. by city	275,000 lb.	.04	.04	.04
45. Engineer's offices	2,200 s. f	10.00	12.00	10.00
46. Chlorinators	7 ea.	3,000.00	3,000.00	1,825.00
47. Liquid chlorine	400,000 lb.	.07	.10	.075
48. Sanitary services	L. S.	55,000.00	75,000.00	14,000.00
49. Clean up	L. S.	15,000.00	5,000.00	5,000.00

CONTRACT 323

1. Seaboard Construction Corp., New York	$10,810,166
2. Siems-Helmers, Inc., Johnson, Drake and Piper, Inc., and Leo Butler & Brothers Co., Katonah, N. Y	11,593,950
3. J. F. Shea Co., Inc. and Henry J. Kaiser Co., Los Angeles	11,979,380

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Test-borings	1,000 l. f.	$7.00	$6.25	$5.50
2. Excav. shafts	18,500 c. y.	24.00	52.00	30.00
3. Excav. tunnel	355,000 c. y.	12.40	14.00	13.00
4. Enlarge. shafts, tunnel, drifts	7,500 c. y.	8.00	14.00	15.00
5. Cement mortar coatings	900 c. y.	25.00	50.00	25.00
6. Sup. shafts, tunnel, drifts	5,000,000 lb.	.07	.08	.10
7. Timber	1,000 M.b.m.	110.00	100.00	125.00
8. Dry packing	4,000 c. y.	5.00	6.50	8.00
9. Pumping	350,000 Mill.f.g.	.10	.55	.30
10. Drainage channels	31,800 l. f.	10.00	23.50	9.00
11. Cut. water-stop channel	650 s. f.	8.40	6.20	5.00
12. Steel lining, shaft, drifts	1,100,000 lb.	.08	.078	.13
13. Steel lining, risers	280,000 lb.	.09	.095	.15
14. Masonry lining forms, shaft 14	570 l. f.	47.25	53.00	25.00
5. Outer masonry lining forms, shaft 13	350 l. f.	68.00	100.00	70.00
16. Inner masonry lining forms, shaft 13	620 l. f.	58.00	60.00	95.00
17. Forms, lining steel risers, shaft 13	760 l. f.	8.40	8.00	14.50
18. Duct., forms, shaft 13	680 l. f.	6.00	10.00	12.00
19. Masonry lining forms, tunnel	31,000 l. f.	14.00	5.70	8.00
20. Conc. masonry, shafts, drifts	12,000 c. y.	12.10	19.00	20.00
21. Conc. masonry, tunnel	150,000 c. y.	9.75	7.00	11.00
22. Excess conc. masonry	16,000 c. y.	5.00	5.00	5.00
23. Bit. curing solution	130,000 s. f.	.10	.10	.15
24. Drill holes, rock or masonry	40,000 l. f.	1.40	1.10	1.50
25. Steel grout pipes	30,000 l. f.	.70	.65	.80
26. Make grouting connections	9,000 ea.	2.75	2.00	8.00
27. Sand for filters, grout, mortar coatings	5,500 c. y.	4.00	4.10	5.00
28. Mix., place grout	16,000 c. y.	15.00	12.75	24.00
29. Removal of soil	37,000 c. y.	1.50	.65	.80
30. Earth excav	15,000 c. y.	3.30	1.60	1.00
31. Rock excav., open cut	4,000 c. y.	10.00	5.00	5.00
32. Refill, embank	60,000 c. y.	1.10	.85	.85
33. Dress surf., grass	28,000 c. y.	1.50	1.25	1.20
34. Timber, open cut	200 M.b.m.	125.00	110.00	120.00
35. Conc. masonry, open cut	5,500 c. y.	22.00	18.00	34.00
36. Granolithic finish	1,600 s. y.	3.00	1.00	2.00
37. Granite trim	200 c. y.	200.00	205.00	275.00
38. Brick facing masonry	150 c. y.	150.00	68.00	70.00
39. Brick backing masonry	900 c. y.	50.00	30.00	40.00
40. Gonc. roof tiles	1,150 s. y.	14.00	10.00	15.00
41. Conc. pipes, blow-off, shaft 13	150 l. f.	5.00	3.70	5.00
42. Vit. pipes, conduits	4,000 l. f.	2.00	1.00	1.30
43. Dry rubble paving	100 c. y.	13.00	20.00	11.50
44. Rubble paving	200 c. y.	15.00	35.00	15.00
45. Crushed stone, gravel	300 c. y.	4.00	7.00	6.00
46. Bit. macadam pave	5,000 s. y.	5.00	3.00	3.50
47. Conc. pave	250 c. y.	10.00	12.50	17.00
48. Portland cement	435,000 bbl.	2.25	2.05	2.70
49. Reinforcing steel	1,000,000 lb.	.08	.06	.08
50. Struc. steel	1,750,000 lb.	.08	.08	.11
51. Steel gratings, etc	45,000 lb.	.20	.18	.15
52. C. I. pipes, fittings	140,000 lb.	.10	.08	.10
53. Misc. iron	190,000 lb.	.20	.11	.20
54. Galvanizing	130,000 lb.	.04	.025	.08
55. Misc. bronze, etc	80,000 lb.	1.00	.50	.60
56. Aluminum doors, sashes	27,000 lb.	1.50	1.30	1.70
57. Install, testing equip., metalwork furn. by City	1,000,000 lb.	.05	.04	.06
58. Painting	350,000 s. f.	.05	.05	.065
59. Engineer's offices	4,000 s. f.	17.00	10.00	6.00
60. Chlorinators	6 ea.	3,300.00	2,000.00	3,000.00
61. Liquid chlorine	250,000 lb.	.10	.07	.10
62. Sanitary services	L. S.	60,000.00	40,000.00	70,000.00
63. Restore grounds, clean.	L. S.	20,000.00	50,000.00	30,000.00

CONTRACT 324

1. The Arthur A. Johnson Corp. and Necaro Co., Long Island City, N. Y	$10,870,238
2. Seaboard Construction Corp., New York	10,904,310
3. S. A. Healy Co., Chicago	10,985,200

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Test-borings	1,000 l. f.	$3.00	$7.00	$6.00
2. Sink. shafts, rock	8,100 c. y.	40.00	33.30	29.00
3. Excav., tunnel	420,000 c. y.	13.00	12.25	13.50
4. Enlarge. shafts, tunnel	7,500 c. y.	8.00	7.00	10.00
5. Protect. cem. mortar coatings	1,000 c. y.	12.00	20.00	20.00
6. Steel support, shafts and tunnel	6,100,000 lb.	.05	.07	.066
7. Timbering, shafts, tunnel	1,000 M.b.m.	100.00	110.00	100.00
8. Dry packing	2,500 c. y.	5.00	4.00	6.00
9. Pumping	450,000 Mill.f.g.	.40	.10	.20
10. Drainage channels	38,100 l. f.	15.00	10.00	9.00
11. Forms, shaft lining	900 l. f.	20.00	44.80	35.00
12. Forms, tunnel lining	37,200 l. f.	11.00	12.80	14.00
13. Conc. masonry, shafts	3,400 c. y.	13.00	17.00	20.00
14. Conc. masonry, tunnel	180,000 c. y.	7.95	10.00	8.20
15. Excess conc. masonry	20,000 c. y.	5.00	5.00	5.00
16. Bit. curing sol	150,000 s. y.	.06	.10	.10
17. Drill. holes rock or masonry	40,000 l. f.	.80	1.00	1.00
18. Steel grout. pipes	35,000 l. f.	.80	.70	1.00
19. Making grout. connect.	9,000 ea.	3.00	2.50	3.00
20. Sand for filters, grout and cement mortar	5,500 c. y.	3.50	4.00	4.00
21. Mix., place grout	20,000 c. y.	9.50	15.00	13.00
22. Removal of soil	40,000 c. y.	1.00	1.00	.78
23. Earth excavation	7,000 c. y.	7.00	3.30	2.00
24. Rock excav., open cut	250 c. y.	7.00	10.00	10.00
25. Refill., embank	40,000 c. y.	.80	1.00	1.00
26. Surface dress. and grass	30,000 c. y.	.90	1.50	1.00
27. Timber, open cut	120 M.b.m.	100.00	100.00	100.00
28. Conc. masonry, open cut	600 c. y.	20.00	22.00	25.00
29. Vitrified pipes	2,500 l. f.	1.00	1.60	.80
30. Dry rubble paving	100 c. y.	10.00	12.00	10.00
31. Rubble paving	100 c. y.	12.00	14.00	15.00
32. Crushed stone, gravel	200 c. y.	4.00	4.00	4.00
33. Portland cement	490,000 bbl.	2.15	2.25	2.15
34. Reinf. steel	25,000 lb.	.07	.08	.05
35. Misc iron	25,000 lb.	.10	.20	.15
36. Engineer's offices	2,200 s. f.	15.00	17.00	20.00
37. Chlorinators	4 ea.	7,500.00	3,300.00	4,000.00
38. Liquid chlorine	25,000 lb.	.08	.10	.20
39. Sanitary services	L. S.	100,000.00	60,000.00	30,000.00
40. Cleaning up	L. S.	20,000.00	28,000.00	20,000.00

UNIT BID PRICES—TUNNELS

MEMPHIS SEWER TUNNELS

OWNER: City Commission, Memphis, Tenn.; Black & Veatch, Engineers, Kansas City, Mo.

PROJECT: Construction of Front St. intercepting sewer. Sections 1, 2, 3 & 4, consisting of 12,082 l.f. of 7 ft. 10 in. steel plate and concrete lined sewer tunnel, and 2,318 l.f. of 6 ft. 4 in. laid 65 ft. underground, and emptying into Mississippi River.

BIDS: Four bids were received in December, 1937, for Section I, ranging from $426,811 to $621,295; six bids on Section II, from $447,735 to $546,902; five bids on Section III, from $454,244 to $556,350; five bids on Section IV, from $429,455 to $620,050. Bids on Section II were resubmitted bids in January, 1938. Sewers are to be constructed by tunnel method in water-bearing sand and gravel, under air pressure. Tunnels are lined with steel plate and concrete. The outlet sewer in Section IV enters the Mississippi River 25 ft. below mean water level. Minimum hourly wage rates are stipulated at $1.625 for skilled and 35c. for common labor, with completion scheduled at 250 days for Section I, 350 days for Sect. II, and 450 days for Sect. III and IV.

LOW BIDDERS:

SECTION I

1. Walsh & Wells, Inc., St. Louis (contract)	$426,811
2. V. E. Schevenell Const. Co., Memphis	573,680
3. Walter S. Rae, Pittsburgh	607,044

SECTION II

1. Noland Const. Co., Detroit (contract)	$447,735
2. Walsh & Wells, Inc., St. Louis	448,000
3. Volz Construction Co., Ripley, Tenn	493,619

SECTION III

1. Noland Const. Co., Detroit (contract)	$454,244
2. V. E.. Schevenell. Memphis	483.502
3. Dravo Corp., Pittsburgh	492.273

SECTION IV.

1. Noland Const. Co., Detroit (contract)	**$429,455**
2. V. E. Schevenell, Memphis	**484,298**
3. Dravo Corp., Pittsburgh	**541,873**

SECTION I.

		Unit Prices		
Item	Quan.	(1)	(2)	(3)
1. Sewer, Sect. B, 7.83-ft	2,625 l. f.	$90.00	$116.00	$121.75
2. Sewer, Sect. C, 6.33-ft	1,416 l. f.	60.00	80.00	100.00
3. Junction and gate struct	L. S.	18,601.60	30,000.00	30,000.00
4. Intercepting structure, Auction Ave	L. S.	18,000.00	30,000.00	14,000.00
5. Manhole, Commerce Ave.	L. S.	2,653.20	2,500.00	4,000.00
6. Alterations, Bayou-Gayso Sta	L. S.	41,026.00	50.000.00	60,000.00
7. New sewage pumping unit.	L. S.	14,700.00	17,000.00	25,000.00
8. Sewage discharge main	L. S.	3,120.00	9,000.00	5,000.00
9. Concrete bulkhead	10 c. y.	20.00	40.00	60.00
10. Remove concrete bulkhead.	10 c. y.	30.00	30.00	10.00
11. Adjustment unit prices:				
a. Tunnel excav	200 c. y.	10.00	25.00	10.00
b. Open cut excav	100 c. y.	3.00	5.00	2.50
c. Tunnel concrete	200 c. y.	12.00	30.00	10.00
d. Open cut concrete	100 c. y.	10.00	30.00	15.00
e. Reinf. steel	20,000 lb.	.04	.06	.05
f. Trench bracing lumber	10 M.b.m.	50.00	50.00	50.00

SECTION II.

1. Sewer, Sec. B, 7.83-ft	2,661 l. f.	104.00	105.00	117.00
2. Sewer, Sect. A, 7.83-ft	902 l. f.	108.00	110.00	116.00
3. Manhole, Poplar Ave	L. S.	7,200.00	4,000.00	5,000.00
4. Intercepting struct., Jeff. Ave	L. S.	15,000.00	12,000.00	7,000.00
5. Intercepting struct., Jeff. Ave	L. S.	300.00	500.00	500.00
6. Intercepting struct., Court Ave	L. S.	15,000.00	12,000.00	18,000.00
7. Gate, intercepting struct., Monroe Ave	L. S.	30,000.00	27,775.00	20,500.00
8. Intercepting struct., sewer, Federal bldg	L. S.	5,200.00	14,000.00	1,500.00
9. Intercepting struct., Union Ave	L. S.	12,000.00	11,000.00	9,500.00
10. Intercepting struct., Union and Wagner	L. S.	11,275.00	18,000.00	6,000.00
11. Concrete bulkhead	10 c. y.	20.00	30.00	20.00
12. Remove concrete bulkhead.	10 c. y.	10.00	30.00	5.00
13. Adjustment unit prices:				
a. Tunnel excav	200 c. y.	5.00	10.00	15.00
b. Open cut excav	100 c. y.	2.00	5.00	3.00
c. Tunnel concrete	200 c. y.	16.00	20.00	15.00
d. Open cut concrete	100 c. y.	14.00	15.00	12.00
e. Reinf. steel	20,000 lb.	.05	.05	[illegible]
f. Trench bracing lumber	10 M.b.m.	50.00	50.00	50.00

SECTION III.

1. Sewer, Sect. A., 7.83-ft	3,623 l. f.	108.00	117.50	151.00
2. Manhole, McCall Pl	L. S.	7,545.00	2,500.00	3,800.00
3. Intercepting struct., Beal Ave	L. S.	12,105.00	8,000.00	7,400.00
4. Intercepting struct. Beal and Wagner	L. S.	5,250.00	15,000.00	5,000.00
5. Intercepting struct., Huling Ave	L. S.	16,025.00	8,000.00	9,600.00
6. Intercepting struct., Huling and Tennessee	L. S.	8,115.00	5.000.00	4.600.00
7. Manhole, Butler Ave	L. S.	6,820.00	2,500.00	3,500.00
8. Concrete bulkheads	10 c. y.	20.00	40.00	25.00
9. Remove concrete bulkheads	10 c. y.	10.00	20.00	35.00
10. Adjustment unit prices:				
a. Tunnel excav	200 c. y.	5.00	25.00	20.00
b. Open cut excav	100 c. y.	2.00	10.00	5.00
c. Tunnel concrete	200 c. y.	16.00	30.00	18.00
d. Open cut concrete	100 c. y.	14.00	30.00	16.00
e. Reinf. steel	20,000 lb.	.05	.06	.05

SECTION IV.

1. Sewer, Sect. A, 7.83-ft	3,173 l. f.	105.00	126.00	151.00
2. Manhole, 150-ft. south of Calhoun	L. S.	7,310.00	3,000.00	3,500.00
3. Gate struct., Georgia and Kansas	L. S.	34,180.00	16,700.00	25,000.00
4. Outlet struct. into Miss. River	L. S.	48,500.00	50,000.00	24,000.00
5. Concrete bulkheads	10 c. y.	20.00	40.00	25.00
6. Remove concrete bulkheads	10 c. y.	10.00	20.00	35.00
7. Adjustment unit prices:				
a. Tunnel excav	200 c. y.	5.00	25.00	20.00
b. Open cut excav	50 c. y.	2.00	10.00	5.00
c. Tunnel concrete	200 c. y.	16.00	30.00	18.00
d. Open cut concrete	50 c. y.	14.00	30.00	16.00
e. Reinf. steel	20,000 lb.	.05	.06	.05

COLUMBIA RIVER JETTY

OWNER: U. S. War Dept.: Capt. S. L. Damon. District Engineer, Portland, Ore.

PROJECT: Repairing north jetty and constructing a spur jetty, tramways and land trackage, and furnishing and placing 470,000 tons of jetty stone and 1,700 cu. yd. concrete at mouth of Columbia River, Pacific County, Washington.

BIDS: Three bids were opened in November, 1937, ranging from a low of $1,179,183 to $1,459,294, with minimum hourly wages stipulated at $1.375 for skilled and 50c. for common labor, and completion scheduled at 570 days after contract award.

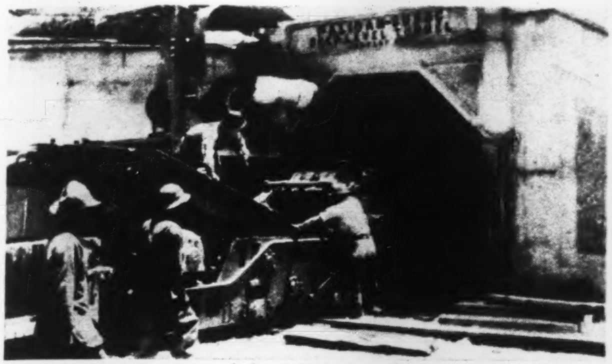
LOW BIDS:

*1. Columbia Construction Co., Bonneville. Ore.	$1,179,183
2. Rohl-Connolly Co., Los Angeles, Calif.	1,196,692
3. Winston Bros. Co. & Guy F. Atkinson Co., Portland, Ore.	1,459,294

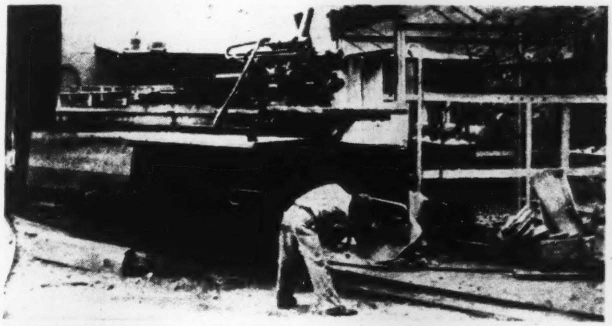
		Unit Prices		
Item	Quan.	(1)	(2)	(3)
1. Clearing	4 acre	$85.00	$50.00	$150.00
2. Embankment	35,000 c.y.	.16	.30	.25
3. Excavation	20,000 c.y.	.26	.50	.25
4. Ballast	7,000 c.y.	2.17	3.00	2.50
5. Remove old tramway	800 l. f.	1.00	3.00	2.50
6. Piles, Douglas fir, 12-16 in.	82,000 l. f.	.48	.50	.60
7. Piles, cutoff, 12-16 in.	4,500 l. f.	.16	.167	.20
8. Piles, Douglas fir, 10-14 in.	62,000 l. f.	53	.50	.60
9. Lumber, Douglas fir	2,170 M.b.m.	39,00	50.00	60.00
10. Bolts, drift	54,000 lb.	.035	.05	.05
11. Bolts and washers	62,000 lb.	.05	.07	.07
12. Spikes, ship, wire	46,000 lb.	.045	.06	.07
13. Spikes, railroad	52,000 lb.	.04	.06	.05
14. Rails, steel, 75-lb. relay	700 ton	50.00	45.00	50.00
15. Frogs, switches, guard rail	9 set	215.00	200.00	300.00
16. Cable, wire, ⅝ in. plus	43,000 l. f.	.025	.05	.05
17. Straps, steel	16,000 lb.	.05	.06	.06
18. Tie plates	20,000 lb.	.03	.06	.06
19. Anti-rail creepers	7,300 ea.	.32	.40	.40
20. Metal pile shoes	1,260 ea.	1.70	1.50	1.40
21. Stone	470,000 ton	1.93	1.85	2.35
22. Concrete	1,700 c.y.	17.25	25.00	22.00
23. Concrete anchor chains	12,000 lb.	.19	.25	.27
24. Install track scales	L.S.	2,750.00	1,000.00	3,250.00

* Contract awarded.

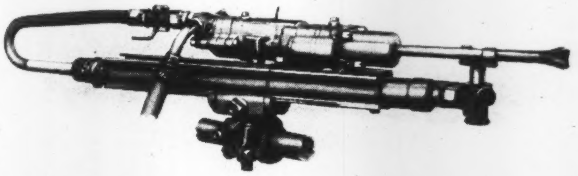
World's Record for Tunnel Driving with WORTHINGTON PNEUMATIC-FEED DRIFTERS



HERE'S THE PORTAL *of the 9450-foot Palidan-Suyoc Tunnel*



HERE'S THE DRILL CARRIAGE *used in driving the Palidan-Suyoc Tunnel. On it are mounted four 3½-inch Worthington Pneumatic-feed Drifters*



HERE'S THE WORTHINGTON DRIFTER *used on the Palidan-Suyoc Tunnel. One of four, it has proved its dependability on many important tunneling jobs in all parts of the world*

THE Palidan-Suyoc Deep-level Tunnel is the first drainage tunnel to be driven in the Philippines using modern methods and equipment. In overcoming natural and human obstacles, the tunnel has been driven with greater speed and at much lower cost than mining men had thought possible. The 1327 feet made in July, 1937, set a new world's record for tunnel driving. This performance becomes particularly notable in the light of the type of labor available and the character of rock encountered.

Four 3½-inch Worthington Pneumatic-feed Drifters helped to set this new world's record. Faster drilling speed, low air consumption, negligible maintenance and the ability to "take it" under the severest operating conditions, make the performance of these drifters noteworthy.

●

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UNIT BID PRICES—RIVER PROTECTION

SAVANNAH RIVER DIKES

OWNER: U. S. War Dept., Savannah, Ga.; Lt. Col. R. F. Fowler, Dist. Engineer.

PROJECT: Construction of 1,490 lin.ft. timber pile dikes and 2,900 lin.ft. of bank protection at Mile, 142, 154 and 159, on Savannah River in Georgia and South Carolina.

BIDS: Four bids were opened July, 1937, ranging from the contract low of $99,707 to a high of $126,999. The three locations are accessible by river and highway. Completion is scheduled for 150 days after contract award. Minimum hourly wage rates are stipulated at $1.00 for skilled and 40c. for common labor.

LOW BIDDERS:

1. C. Y. Thomason Const. Co., Greenwood, S. C. (contract)	$99,707
2. Simons-Mayrant Co., Charleston, S. C.	107,455
3. Salmon Dredging Co., Charleston, S. C.	117,244

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Wood piles, creosoted	23,416 l. f.	$1.00	$0.90	$0.95
2. Lumber mattress, dike	384 sq.	13.00	15.00	12.00
3. Stone mattress, dike	1,305 ton	4.00	4.75	5.33
4. Paving stone	2,261 ton	4.50	5.50	6.97
5. Grading	3,780 c. y.	.80	.75	1.00
6. Lumber mattress, bank	1,240 sq.	15.00	15.00	12.00
7. Stone mattress, bank	2,315 ton	4.00	4.75	5.33
8. Paving stone, bank	4,760 ton	4.50	5.50	6.97
9. Grading, bank	4,500 c. y.	.80	.75	1.00

MISSOURI RIVER DIKES, IOWA

OWNER: U. S. Engineer Dept.; Capt. H. B. Loper, District Engineer, Omaha, Neb.

PROJECT: Construction of 16,970 lin. ft. standard dikes and 4,355 lin. ft. of abatis in the Missouri River at Little Sioux-Bullard Bends.

BIDS: Seven bids were opened in July, 1937, ranging from the contract low of $371,627 to $411,106, based on the contractor furnishing all materials and minimum hourly wages of 82½c. for skilled and 50c. for common labor. At the point of construction the channel is changeable, with swift current and mud and sand bottom.

LOW BIDDERS:

1. A. W. Farney, Inc., Kansas City, Mo. (contract)	$371.627
2. W. P. McGeorge, Pine Bluff, Arkansas	399.056
3. Massman Const. Co., Kansas City, Mo.	400.719

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Lumber mattress, fabric	380 sq.	$5.50	$8.00	$7.50
2. Lumber mattress	14,280 sq.	7.60	7.40	7.50
3. Mattress, dike stone	19,200 ton	3.10	3.60	3.50
4. Hand paving stone	1,330 ton	5.50	4.50	5.00
5. Paving spalls	650 ton	3.10	3.50	3.60
6. Piles, stringers, braces	383,200 l. f.	.472	.52	.518
7. Abatis mattress	870 sq.	5.50	8.00	7.50
8. Mattress stone abatis	520 ton	4.00	3.70	3.75
9. Abatis timbers	47,000 M.b.m.	.08	.08	.10
10. Wire fabric screening	700 sq.	2.20	3.00	3.00
11. Deadmen	220 ea.	5.00	4.00	3.80

MISSISSIPPI RIVER DIKES

OWNER: U. S. Engineer Dept., St. Louis, Missouri; Lt. Col. P. S. Reinecke, District Engineer.

PROJECT: Construction of 3,300 lin. ft. of piling dikes in the Mississippi River at Ste. Genevieve, Ill. and Mo., and 1,300 lin. ft. of bank protection at Greenfield Bend-Hurricane Field.

BIDS: Four bids were received on the piling dikes and three on the bank protection in August, 1937, with completion scheduled for the former at 140 days, and the latter 45 days, and minimum hourly wages stipulated at $1.10 for skilled and 50c. for common labor. Proposals ranged from $77.880 to $88,175 for the dikes, and from $36.590 to $42.968 for the bank protection.

LOW BIDS:

I. Piling Dikes—Ste. Genevieve:

1. Patton Tully Transportation Co., Memphis, Tenn.	$77.880
2. Woods Bros. Const. Co., Lincoln, Neb.	81.605
3. R. B. Potashnick, Cape Girardeau, Mo.	82.325

II. Bank Protection—Greenfield-Hurricane:

1. Woods Bros. Const. Co., Lincoln, Neb.	$36.590
2. R. B. Potashnick, Cape Girardeau, Mo.	40.448
3. Badgett Const. Co., Memphis, Tenn.	42.968

I. PILING DIKES — STE. GENEVIEVE. (3,300 L. F.)

Items	Quan.	Unit Prices (1)	(2)	(3)
1. Lumber mattress	210 M.b.m.	$55.00	$61.00	$70.00
2. Stone, mattress, dike	4,400 c. y.	2.75	2.70	3.00
3. Stone, hand paving	250 c. y.	5.25	4.95	5.00
4. Stone, cast paving	250 c. y.	3.25	2.95	3.50
5. Stone, crushed	200 c. y.	3.25	2.95	3.50
6. Timber piles, round	105,000 l. f.	.435	.45	.43
7. Pile stringers	11,000 l. f.	.48	.60	.55
8. Grading	2,000 c. y.	.25	.25	.20

II. BANK PROTECTION — GREENFIELD-HURRICANE. (1,300 L. F.)

		Unit Prices (1)	(2)	(3)
1. Lumber mattress	178 M.b.m.	$54.00	$70.00	$70.00
2. Stone, mattress	1,600 c. y.	2.70	3.10	3.40
3. Stone, hand paving	1,700 c. y.	4.80	4.10	4.70
4. Stone, cast paving	1,700 c. y.	3.05	3.50	3.90
5. Stone, crushed	1,100 c. y.	3.20	3.50	3.50
6. Timber piles, round	7,800 l. f.	.39	.50	.51
7. Grading	13,100 c. y.	.21	.18	.20

MISSOURI RIVER DIKES, NEBR.

OWNER: U. S. Engineer Dept.; Capt. H. B. Loper, District Engineer, Omaha, Neb.

PROJECT: Construction of 12,375 lin. ft. standard dikes and 645 ft. abatis in the Missouri River at Omaha Mission-Monoana Bends, near Omaha, Nebr.

BIDS: Eight bids were opened in July, 1937, ranging from $144,909 to $187,519. The Government furnishes all lumber, piles and crib timber estimated at $120.459.

LOW BIDS:

1. Woods Bros. Const. Co., Lincoln, Nebr.	$144.909
2. W. P. McGeorge, Pine Bluff, Ark.	158.789
3. Addison Miller, Inc., St. Paul, Minn.	163.761

	Quan.	Unit Prices (1)	(2)	(3)
PILE DIKE ITEMS				
1. Lumber fabric mattress	170 sq.	$5.00	$5.00	$6.00
2. Lumber mattress	10,136 sq.	3.40	3.90	4.60
3. Mattress, dike stone	12,850 ton	3.25	3.60	3.40
4. Hand paving stone	800 ton	5.50	4.75	6.00
5. Paving spalls	390 ton	3.00	3.60	4.00
6. Piles, stringers, braces	269,800 l. f.	.16	.17	.17
CRIB DIKE ITEMS				
7. Willow mattress	390 sq.	8.50	10.00	10.00
8. Crib, mattress stone	2,455 ton	3.30	3.60	3.30
9. Hand paving stone	135 ton	5.50	4.75	5.50
10. Paving spalls	65 ton	3.00	3.60	4.10
11. Deadmen	2 each	50.00	50.00	30.00
12. Crib poles	20 each	4.50	2.00	2.50
13. Place crib timbers	27,300 l. f.	.17	.20	.16
ABATIS ITEMS				
14. Lumber fabric mattress	130 sq.	5.00	5.00	7.50
15. Mattress stone	80 ton	3.30	3.80	4.00
16. Timbers	7 M.b.m.	85.00	.08	.11
17. Wire fabric screening	100 sq.	2.30	2.50	3.00
18. Deadmen	35 ea.	5.00	3.00	10.00

UNIT BID PRICES—DREDGING

CAPE COD CANAL DREDGING

OWNER: War Department, U. S. A. Lt. Col. A. K. B. Lyman, district engineer.

PROJECT: Dredging of 3,439,400 c. y. (place measurement) of material in Hog Island Channel, Buzzards Bay, Mass. to a depth of 32 ft. below mean low water, and to varying bottom widths. Material is to be disposed of in dikes, with spoil areas located within 3,700 ft. of the cut.

BIDS: Four bids were opened on April 12, 1937, and ranged from the contract low of $668,619 to a high of $856,411, for the combined sections A and B. One bid only of $690,948 was received for Section B which comprises 60 per cent of the total yardage.

CONDITIONS: Both sections are accessible by highway and railroad. Completion is scheduled within 8 months after contract award, with minimum hourly rates stipulated of $1.20 for skilled and 50c. for common labor.

LOW BIDDERS:

1. Atlantic, Gulf & Pacific Co., New York, N. Y.	$668,619
2. Standard Dredging Co., New York, N. Y.	753,229
3. American Dredging Co., Philadelphia, Pa.	856,411
4. Arundel Corporation, Baltimore, Md. (Sect. B only)	690,943

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Dredging Section Z	1,419,100 c. y.	No bids		
2. Dredging Section B	2,20,300 c. y.	(By Bidder No. 4 only=$0.342)		
3. Dredging combined sections	3,439,400 c. y.	$0.1944	$0.219	$0.249

HARBOR DREDGING, OHIO

OWNER: U. S. Engineer Department, Col. J. A. O'Connor, District Engineer, Buffalo, N. Y.

PROJECT: Excavation of 406,000 c. y. material other than shale and of 277,800 c. y. shale, place measurement, in Conneaut Harbor, Ohio.

BIDS: Four bids were opened in July, 1937, ranging from $1,231,930 to $1,367,410.

LOW BIDDERS:

1. Merritt-Chapman & Scott Corp., New York, N. Y.	$1,231,930
2. Dunbar & Sullivan Dredging Co., Detroit, Mich.	1,270,394
3. Great Lakes Dredge & Dock Co., Cleveland, Ohio	1,284,284

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Material, not shale	406,000 c. y.	$0.40	$0.44	$0.44
2. Shale	277,800 c. y.	3.85	3.93	3.98

HARBOR DREDGING, CONNECTICUT

OWNER: U. S. War Department; E. W. Crawley, Senior Engineer, Providence, R. I.

PROJECT: Dredging in Fivemile River Harbor in a channel 100 ft. wide and 3,000 ft. long, above the plane of 8 ft. below mean low water; in Norwalk Harbor in a channel 75 ft. wide and 2,700 ft. long, above the plane of 7 ft. below mean low water.

BIDS: Five bids were opened June 23, 1937, ranging from a low of $23,987 to a high of $33,034.

CONDITIONS: Work is scheduled for completion within five months after contract award with minimum hourly wage rates stipulated of $1.125 for skilled and 50c. for common labor. The mean tide range is about 7.2 ft. with the site of the work well protected and no obstructions enroute to dumping grounds.

LOW BIDDERS: Based on 83,000 c.y.

1. U. S. Packard Dredging Co., Boston, Mass.	$23,987
2. Herbert T. Gerrish, Boston, Mass.	27,971
3. Bay State Dredging & Contracting Co., East Boston, Mass.	28,967

Bidder, Proposed Method and Unit Price

1. By dipper and hydraulic dredges	$0.289
2. By hydraulic dredge	0.337
3. By clamshell dredge	0.349
4. Engineers' estimate	0.31

RIVER DREDGING, VIRGINIA

OWNER: U. S. Engineer Department, Washington, D. C., District, W. D. Ludlow, Dist. Engineer.

PROJECT: Dredging 165,000 c. y. from Little Wicomico River at mouth of Potomac River and Chesapeake Bay, in Virginia.

BIDS: Four bids were opened in July, 1937, ranging from $36,218 to $40,260, with the low bidder stipulating a rate of prosecution of 60,000 c. y. per month.

LOW BIDDERS:

1. Atkinson Dredging Co., Norfolk, Va.	$36,218
2. Lukens Dredging & Contr. Co., Baltimore, Md.	37,092
3. C. Walker Hodges Dredging Co., New Bern, N. C.	38,610

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Dredging, place measure	165,000 c. y.	$0.234	$0.2195	$0.244

OSWEGO CANAL, NEW YORK

OWNER: New York State Dept. Public Works; T. F. Farrell, Chief Engr., Albany.

PROJECT: Dredging Oswego Barge Canal between Three Rivers and Lock 2, New York, to deepen it 12 to 14 ft., and reduce curves.

BIDS: Three bids were opened in November, 1937, ranging from the contract low of $2,598,350 to $2,998,500, with minimum hourly wages stipulated of 75c. to $1.75 for skilled and 50c. for common labor.

LOW BIDDERS:

1. Dunbar & Sullivan, Detroit (contract)	$2,598,350
2. Great Lakes Dredge & Dock Co., New York	2,783,980
3. Arundel Corp., Baltimore	2,998,500

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation, not rock	570,000 c. y	$1.85	$1.91	$1.85
2. Ledge rock	107,000 c. y.	14.05	15.44	18.00
3. Drill line holes	3,600 l. f.	10.00	12.00	5.00

WHARF SHEDS, CORPUS CHRISTI

OWNER: Nueces County Navigation District; Robt. J. Cummins, Engineer.

PROJECT: Construction of wharf, 650x180 ft., of reinforced concrete and treated timber piles; frame shed, 120x350 ft., corrugated iron sides and roof; shed, addition to Wharf No. 9, 120x160 ft., corrugated iron sides and roof; railroad tracks and spurs; all located at north side of turning basin, Corpus Christi Bay, Texas.

BIDS: Nine bids were opened June, 1937, ranging from the contract low of $341,200 to $442,000, with completion scheduled for 165 days after contract award, minimum hourly wages stipulated of $1.875 for skilled and 45c. for common labor, and contractor furnishing all the materials required in the construction. Following unit prices are a breakdown furnished by fourth bidder, principal items only included. Bids were called for on lump sum basis.

LOW BIDDERS:

1. A. J. Rife Construction Co., Dallas, Texas (contract)	$341,200
2. Brown & Root, Corpus Christi, Texas	352,000
3. H. B. Zachry, Laredo, Texas	360,630
4. McKenzie Const. Co., San Antonio, Texas	368,942

BREAKDOWN OF PRINCIPAL QUANTITIES AND UNIT PRICES

(Fourth low bidder.)

1. Concrete, Cl. A	5,280 c. y.	$8.50
2. Concrete, Cl. AA	3,860 c. y.	8.50
3. Forms	28,000 s. f.	.22
4. Reinforcing steel	60,000 lbs.	.0425
5. Creosoted piling, 22 ft.	6,600 l. f.	1.45
6. Creosoted piling, 12 ft.	1,800 l. f.	1.25
7. Creosoted lumber, 12 ft	16 Mfb.m.	110.00
8. Riprap	3,200 ton	3.00
9. Caliche	1,800 ton	1.90
10. Uvalde rock asphalt	8,000 s. y.	.60
11. Fill	12,000 c. y.	.45
12. Sprinkler heads	80 ea.	5.00
13. Cast iron pipe, 8 in	3,200 l. f.	2.00
14. Gal. iron, 8 ft. square	86 ea.	3.40

R. R. TERMINAL, SAN FRANCISCO

OWNER: Dept. Public Works, California; C. H. Purcell, Chief Engineer.

PROJECT: Construction of railway facilities for San Francisco terminal of the San Francisco-Oakland Bay Bridge consisting of a three-story concrete and steel building, 165 x 700 ft., volume of 7,096,682 cu. ft., designed under supervision of Glenn B. Woodruff, chief engineer of design. General construction includes demolition and removal of buildings not previously razed under former contracts, construction and structural steelwork of the terminal, mechanical and electrical work on the terminal, and street crossings of the train viaduct approach.

BIDS: Proposals were invited in four subdivisions, described as general construction, structural steel work, mechanical installation, and electrical installation. Four bids were received on the general construction ranging from the contract low of $1,658,510 to $1,848,291; three bids on the structural steel work ranging from the contract low of $442,360 to $453,240; six bids on the mechanical installation ranging from $109,257 to $125,745; six bids on the electrical installation ranging from $73,250 to $79,911. Minimum hourly rates are stipulated at $1.10 for skilled and 75c. for common labor.

GENERAL DESCRIPTION: Tracks and loading platforms will be entirely roofed over a length of 700 ft. with large skylights and windows providing ample lighting. Trains will come in to the terminal with platforms between alternate tracks. The main station width will be 164 ft., with a large waiting room in the center on the ground floor. Passengers from bridge trains on the elevated level above the mezzanine floor may leave the concourse directly by means of outdoor and indoor ramps located at each end of the station and in front of the head house. Rest rooms and concessions will be situated around the waiting room. On the mezzanine floor, between the ground floor and the track level, information booths, ticket offices and more concessions will be located. Passengers may travel directly from the mezzanine to street cars at the same level. Floor will be of terrazzo, waiting room walls of terra cotta tile and noise minimized to as great an extent as possible through acoustical treatment.

CUBIC FOOT COSTS: The cubic foot costs on the basis of awards in each case, are: 23.37c. for general construction; 1.54c. for mechanical; 1.03c. for electrical, and 6.23c. for structural steel. The following unit tabulation of the three low bidders indicate unit prices and quantities of a large number of the elements entering into the construction. Where these are lacking, the cubic foot costs of the classifications are shown, designated in the tabulations as c.f.b.

GENERAL CONSTRUCTION CONTRACT R-2A

1. MacDonald and Kahn Co., San Francisco (contract)	$1,658,510
2. Geo. A. Fuller Co., Los Angeles	1,755,880
3. Barrett & Hilp, San Francisco, and A. Teichert & Son, Sacramento	1,824,245

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Demolition, bldgs.	L. S.	$16,000.00	$11,340.00	$40,000.00
2. Remove concrete	5,500 c. y.	2.50	2.21	3.00
3. Excavation	28,000 c. y.	1.75	1.95	2.50
4. Fill	20,000 c. y.	.70	.59	.60
5. Pull exist. piles	100 ea.	60.00	34.00	25.00
6. Cut off exist. piles	1,000 ea.	2.80	1.70	1.50
7. Timber piles	160,000 l. f.	.52	.65	.60
8. Concrete piles	13,500 l. f.	2.00	2.50	2.50
9. Concrete foundations	10,000 c. y.	10.00	9.07	10.50
10. Basement slabs	4,100 c. y.	10.00	10.21	11.00
11. Concrete curbs	110 c. y.	11.50	29.48	20.00
12. Superstructure conc.	22,000 c. y.	19.50	24.21	22.00
13. Extra Portland cement	2,000 bbl.	1.75	2.27	3.00
14. Feralun stair treads	c. f. b.	.004	.003	.0036
15. Reinfg. steel	5,000,000 lb.	.0532	.0499	.065
16. Firebrick	c. f. b.	.00004	.00007	.00004
17. Hollow tile	c. f. b.	.0008	.0007	.0008
18. Granite	c. f. b.	.0044	.0055	.0050
19. Roofing	c. f. b.	.0018	.0016	.0018
20. Dampproofing	c. f. b.	.00037	.00025	.0003
21. Waterproofing	c. f. b.	.0026	.0025	.0025
22. Vibration insulation	c. f. b.	.0036	.0036	.0030
23. Sheetmetal	c. f. b.	.0075	.0064	.0072
24. Steel flooring	c. f. b.	.0007	.0007	.0007
25. Misc. iron	c. f. b.	.0044	.0044	.0044
26. Ornamental iron	c. f. b.	.0100	.0105	.0092
27. Aluminum	c. f. b.	.0046	.0044	.0045
28. Steel windows	c. f. b.	.0013	.0014	.0014
29. Steel hollow metal	c. f. b.	.00017	.00004	.00023
30. Rough carpentry	c. f. b.	.00085	.00097	.00099
31. Finish carpentry	c. f. b.	.0032	.0036	.0032
32. Metal lathing, furring	c. f. b.	.0016	.0013	.0014
33. Interior plastering	c. f. b.	.00018	.00016	.00016
34. Acoustical treatment	c. f. b.	.00011	.00006	.00006
35. Terrazzo	c. f. b.	.0095	.0097	.0092
36. Kalman floor	c. f. b.	.0025	.0025	.0025
37. Marble	c. f. b.	.0008	.0008	.0008
38. Glazed and ceramic tile	c. f. b.	.0015	.0013	.0013
39. Terra cotta unit tile	c. f. b.	.0061	.0059	.0058
40. Asphalt tile, linoleum	c. f. b.	.00001	.00001	.00001
41. Glass and glazing	c. f. b.	.00011	.00011	.00011
42. Paint bridge steel	2,000 ton	10.00	3.96	7.50
43. Paint roof steel	560 ton	10.00	3.96	9.00
44. Paint catenary bridges	280 ton	10.00	3.96	12.00
45. Waterproof concrete	11,500 s. y.	.30	.34	.30
46. General painting	c. f. b.	.0024	.0035	.0025
47. Finish hardware	c. f. b.	.0014	.0013	.0014
48. Flagpoles	2 ea.	600.00	801.00	800.00
49. Bronze exp. plates	1,600 lb.	1.50	.45	.40
50. Fire extinguishers	c. f. b.	.0002	.00025	.00024
51. General cleaning	c. f. b.	.0007	.0028	.0015
52. Redress granite curb.	600 l. f.	1.00	.85	.80
53. Reset granite curb	1,600 l. f.	1.50	1.02	1.00
54. Granite curb, straight	400 l. f.	2.50	2.49	2.50
55. Granite curb, curved.	100 l. f.	4.00	3.40	3.00
56. Brick catchbasins	12 ea.	100.00	105.60	90.00
57. Asphaltic concrete	1,650 ton	5.00	5.09	5.00
58. Liquid asphalt, type SC2	5 ton	25.00	26.08	25.00
59. Liquid asphalt, type MC3	5 ton	30.00	28.08	30.00
60. Stone screenings	50 ton	4.00	4.14	4.00
61. Street castings	2,000 lb.	.10	.067	.07
62. Reset street castings.	12 ea.	30.00	24.95	25.00
63. Vitrified pipe, 10 in.	400 l. f.	3.50	3.29	3.50
64. Fencing	c. f. b.	.00033	.00018	.00018
65. Elevators	c. f. b.	.0003	.00015	.0002

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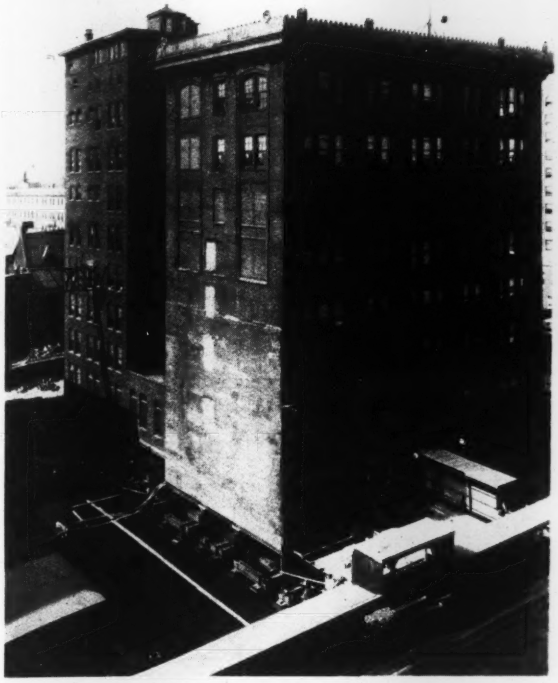

TELEPHONE BUILDING, Indianapolis, 8-story building—100 feet x 135 feet, weight—12,000 tons, moved 52 feet and turned 90 degrees. Telephone service, steam heat, water and sanitary services maintained. Three elevators operated during entire operation.

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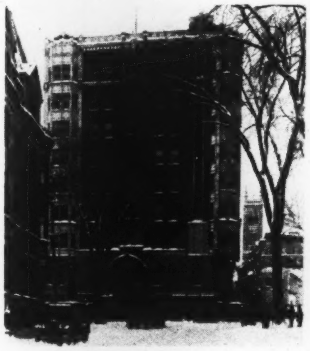
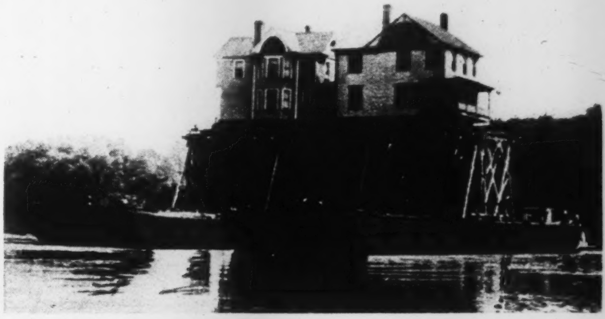


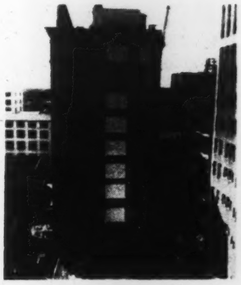
APARTMENT HOUSE, Albany, moving across street to new location.

WATER TANK, moved to new foundation.



VILLAGE MOVES. Twelve houses move across river at Charleston, W. Va.

CHURCH MOVED, for street widening in Philadelphia.



STORE, Hartford, 9-story building moved 112 feet.

INDUSTRIAL BUILDING, moved to clear site for larger structure.

Eichleay ENGINEERING CORP. E·E·C

311 Ross Street
Pittsburgh, Pa.

Branch Office, 1600 Arch Street, Philadelphia, Pa.

UNIT BID PRICES—CANALS

STRUCTURAL STEEL — CONTRACT R-2B

1. Columbia Steel Co., San Francisco, Cal. (contract)	$442,360
2. Bethlehem Steel Co., San Francisco, Cal	451,152
3. Geo. A. Fuller Co., Los Angeles, Cal	453,240

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Steel, bridges	4,000,000 lb.	.0765	.0786	.0781
2. Steel, roof framing	1,120,000 lb.	.077	.0776	.0785
4. Catenary bridges	560,000 lb.	.0895	.0890	.0945

MECHANICAL INSTALLATION — CONTRACT R-2C

1. Geo. A Fuller Co., Los Angeles	$107,400*
2. Scott Co., San Francisco (contract)	109,257
3. Anderson & Rowe, San Francisco	114,474

* Geo. A. Fuller Co. submitted a combined bid for all subdivisions totaling $2,391,820.

Item	Unit Costs per Cu. Ft. Bldg. (1)	(2)	(3)
1. Plumbing fixtures, service piping	$0.0032	$0.0033	$0.00319
2. Plumbing fixtures, service piping	.0029	.00319	.0029
3. Roof & track drainage	.0016	.0018	.00159
4. Hose rack & Water piping	.0013	.0015	.0015
4x. Hose rack & water piping	.0011	.0013	.0010
5. Gas piping system	.00009	.00007	.00009
6. Boilers, piping, oil tanks, pumps	.0019	.0016	.0018
7. Radiation & steam piping	.0018	.0023	.0017
8. Station ventilation	.0031	.0033	.0030
9. Garage ventilation	.0020	.0014	.0033
9x. Garage ventilation	.0015	.0022	.0015

ELECTRICAL INSTALLATION — CONTRACT R-2D

1. Radelfinger Bros., San Francisco, Cal. (contract)	$73,250
2. Central Electric Co., San Francisco, Cal	73,987
3. Geo. A. Fuller Co., Los Angeles, Cal	75,300

Item	Unit Costs per Cu. Ft. Bldg. (1)	(2)	(3)
1. General lighting	$0.005	$0.0048	$0.005
3. Lighting fixtures	.0019	.0019	.002
4. Fire alarm system	.0004	.0004	.0004
5. Clocks	.0002	.0002	.0002
6. Signs	.00008	.0008	.0006
7. Public address system	.008	.00086	.0009
8. Power wiring	.0009	.0009	.0006
9. Emergency lighting	.0017	.0007	.0008

BUNKER AND WHARF, CAL.

OWNER: U. S. War Department, San Francisco, Calif.

PROJECT: Construction of reinforced concrete abutment, wharf and approach including relocation of coal bunker and removal and disposal of existing wharf in Horseshoe Bay at Fort Baker, Marin Co. Calif.

BIDS: Two bids were received May 28, 1937 ranging from a low of $209.794 to a high of $227.807 as compared with the engineers estimate of $156,799 and the appropriation of $130.000.

CONDITIONS: Contractor furnishes all labor and material required for the completion of the project which is scheduled for 180 days after contract award.

LOW BIDDERS:

1. Duncanson—Harrelson Co. San Francisco	$209.794
2. A. W. Kitchen & Co. San Francisco	227.807
3. Engineers estimate	156.799

Item	Quan.	Unit Prices		
1. Move, reset bunker, tel. pole.	l. s.	$650.00	$516.00	$1,025.00
2. Remove fender piles, wharf deck	l. s.	2,200.00	10,153.00	5,800.00
3. Pull concrete piles	22 ea.	64.50	40.00	40.00
4. Cut concrete piles	22 ea.	75.00	62.50	54.00
5. Excav., struct	220 c. y.	6.10	15.00	5.00
6. Backfill	250 c. y.	1.65	1.75	1.00
7. Conc. cl. A, waterproofing	1,470 c. y.	20.00	22.75	15.50
8. Reinf. steel	217,000 lb.	.065	.053	.05
9. Concrete piles	23,000 l. f.	4.14	3.92	3.00
10. Conc. piles, rock anchorage	2,350 l. f.	5.10	12.00	4.00
11. Wood piles, creosoted	7,450 l. f.	1.10	.94	.80
12. Creosoted timber	39 M.b.m.	130.00	146.60	90.00
13. R. R. track, fittings	23,000 lb.	.173	.198	.12
14. Steel shoes, piles	389 ea.	6.50	6.32	5.00
15. Misc. hdw. bolts, washers	13,000 lb.	.09	.068	.08
16. Struct. steel plate, washers	1,660 lb.	.06	.078	.05
17. Corros. proof steel bolts	150 lb.	1.20	1.10	.20
18. C. I. shoes, conc. piles	67 ea.	8.00	7.70	6.00
19. C. I. mooring bits	7 ea.	120.00	116.00	130.00
20. C. I. mooring cleats	8 ea.	61.00	58.00	70.00
21. C. I. washers, spec	2,300 lb.	.29	.34	.10
22. Fibre conduit	870 l. f.	.32	.58	.20
23. Metal conduit	70 l. f.	2.20	1.90	.20
24. Junct. box, type A	3 ea.	40.00	45.00	5.00
25. Junct. box, type B	5 ea.	33.00	28.00	5.00
26. Asphalt conc. pavement	29,700 s. f.	.20	.153	.10
27. Conc. batter piles	4,200 l. f.	5.00	4.50	3.10

ROOSEVELT DAM CANAL

OWNER: U. S. Bureau of Reclamation; R. F. Walker, chief engineer, Denver.

PROJECT: Construction of earthwork, canal lining and structures for Roosevelt power canal and additions to diversion dam, Salt River project, 20 miles northwest of Globe, Ariz.

BIDS: Seven bids were opened June 24, 1937, ranging from the low of $78.750 to a high of $125.578, with contract scheduled for completion within 120 days after award.

LOW BIDDERS:

1. Gates & Huntley, Los Angeles, Calif	$78.750
2. J. A. Terteling & Sons, Boise, Idaho	87.780
3. Macco Construction Co., Clearwater, Calif	88.300

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Care river	l. s.	$2,300.00	$3,000.00	$3,000.00
2. Excav. canal, Cl. 1	12,700 c. y.	.70	.50	.60
3. Excav. canal, Cl. 2	3,000 c. y.	1.00	1.00	1.00
4. Excav. canal, Cl. 3	300 c. y.	2.00	2.00	3.00
5. Excav. canal struct. Cl. 1	200 c. y.	1.00	2.00	1.50
6. Excav. canal struct. Cl. 2	50 c. y.	2.00	3.00	3.00
7. Excav. canal struct. Cl. 3	70 c. y.	4.00	3.00	4.00
8. Excav. misc. diversion	2,800 c. y.	2.60	2.00	1.20
9. Remove conc. struct., lining	40 c. y.	8.00	10.00	5.00
10. Conc. dem., diversion dam	160 c. y.	6.00	5.00	5.00
11. Remove conc., tunnels	40 c. y.	50.00	40.00	50.00
12. Trim canal, conc. lining	5,300 c. y.	.20	.40	.35
13. Backfill, structures	1,950 c. y.	.50	.40	.30
14. Tamp backfill, struct's	300 c. y.	1.00	.40	.60
15. Conc., canal struct's	380 c. y.	25.00	25.00	50.00
16. Conc. canal lining	450 c. y.	20.00	25.00	25.00
17. Conc. apron, diversion	850 c. y.	20.00	25.00	14.00
18. Conc., tunnels	70 c. y.	15.00	25.00	40.00
19. Gunite	6,200 c. f.	1.00	1.50	1.00
10. Place reinf. bars	160,000 lb.	.03	.03	.02
11. Dry rock paving	100 s. y.	4.00	2.00	5.00
22. Drill, grout anchor	2,100 l. f.	.25	1.00	1.00
23. Erect timb. struct's	1 m.b.m.	100.00	50.00	70.00
24. Install gate hoists	6,500 lb.	.10	.10	.10
25. Install misc. metal	180,000 lb.	.07	.10	.15

CANAL EARTH LINING, CALIF.

OWNER: U. S. Bureau Reclamation. L. J. Foster, const. engr.

PROJECT: Earth lining for All-American Canal, California, near intake end. Lining is applied to fifteen scattered sections from 350 ft. to 1,450 ft. long each, on canal section between Sta. 51-50 and Sta. 691-46.

CONDITIONS: Canal sides on 1½:1 slopes are to be covered with selected earth 24 ft. wide on horizontal plane. All lining below 1 ft. above high water to be placed in layers 6 in. thick compacted with twelve rollings of sheepsfoot roller; lining above that level to be uncompacted placed in 12-in. layers. Canal surface to be plowed and sprinkled before applying first layer. Material to come from eight approved borrow pits, haul 500 ft. to 8,000 ft. over contractor's own roads. Water up to optimum moisture content to be added at pits; additional sprinkling at fill if required. Minimum wage rates specified vary from 50c. to $1.10.

BIDS: Nine bids opened Sept. 2, 1937, under U.S.B.R. Spec. 744. Range of bids $147.462 to $222.820.

LOW BIDDERS:

1. A. S. Vinnell Co., Alhambra, Cal	$147.462
2. Zybach & Trowbridge, Columbus, Nebr	147.642
3. Kuhn Bros., Inc., Manhattan Beach, Cal	158.584

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Compacted lining	243,200 c. y.	$0.56	$0.5475	$0.615
2. Uncompacted lining	64,400 c. y.	.175	.225	.14

UNIT BID PRICES—CANALS

BLACK CANYON CANAL, IDAHO

OWNER: Bureau of Reclamation, U. S. A.; R. J. Newell, Const. Engineer.

PROJECT: Construction of earth work, canal lining and structures for Black Canyon Canal, Sta. 157 to Sta. 477.25, Payette division.

BIDS: Two bids were opened September 20, 1937, in Boise. The contract awarded for $174,334, the other bids was of $180,606.

LOW BIDDERS:

1. Haas, Doughty & Jones and Marshall & Stacy, San Francisco (contract)	$174,334
2. Geo. B. Henly Const. Co., Ontario, Oregon	180,606

Item	Quan.	Unit Prices (1)	(2)
1. Excav. canal, common	701,000 c. y.	$0.07	$0.03
2. Excav. canal, rock	10,300 c. y.	.40	.08
3. Excav. core banks	66,000 c. y.	.12	.12
4. Overhaul	300,000 sta. c. y.	.03	.03
5. Excav. struct. rock	300 c. y.	.60	.50
6. Excav. struct. common	26,700 c. y.	.30	.50
7. Excav. drains, channels, dikes, common	16,500 c. y.	.15	.20
8. Excav. drains, channels, dikes, rock	300 c. y.	.15	.20
9. Compact canal embankment	6,000 c. y.	.15	.30
10. Prepare rock found., conc. lining	500 s. y.	.60	.40
11. Trim earth found's, conc. lining	11,500 s. y.	.48	.40
12. Earth lining, canal	50,000 c. y.	.20	.10
13. Gravel, inside slope	1,000 c. y.	2.00	1.50
14. Backfill, structures	15,100 c. y.	.15	.20
15. Puddle backfill	3,750 c. y.	.30	.50
16. Concrete, structures	2,340 c. y.	14.75	15.00
17. Concrete, canal lining	1,220 c. y.	10.00	9.00
18. Place reinf. bars	435,900 lb.	.02	.02
19. Dry-rock paving	3,200 s. y.	1.50	1.50
20. Riprap	20 c. y.	3.00	5.00
21. Erect st. steel bridge	77,000 lb.	.025	.02
22. Erect timber bridges	154 M. b. m.	20.00	20.00
23. Remove pipe lines	6,000 l. f.	.125	.20
24. Install metal pipe, 4 in., 6 in. diam.	1,500 lb.	.05	.10
25. C. m. pipe, 24 in. and 30 in	50 l. f.	.50	1.00
26. Lay conc. pipe, 4 in	600 l. f.	.30	.25
27. Underdrains, uncem. joints, 6 in	900 l. f.	.10	.75
28. Lay conc. pipe, 6 in	4,408 l. f.	.30	.25
29. Lay conc. pipe, 8 in	600 l. f.	.40	.35
30. Lay conc. pipe, 10 in	340 l. f.	.50	.50
31. Lay conc. Lock-joint pipe, 12 in	2,000 l. f.	.60	.50
32. Lay conc. Lock-joint pipe, 15 in	958 l. f.	.75	.65
33. Lay conc. Lock-joint pipe, 18 in	294 l. f.	.75	1.00
34. Gates, gate hoists	30,750 lb.	.03	.05
35. Misc. metal work	6,400 lb.	.03	.07

SIPHON PIPE CROSSING, ALL-AMERICAN CANAL, CALIFORNIA

OWNER: Bureau of Reclamation, Dept. of Interior.

PROJECT: Construction of two parallel steel pipe siphons, each 374 ft. long and 15.5 ft. in diameter, over the New River crossing of the All-American Canal near Calexico, Cal. Each of the two pipes will be fabricated in five units of 72 ft. lengths, with four end units of 7 ft. lengths. The appurtenant construction work includes the inlet and outlet structures, the four intermediate piers to carry the siphon, setting the pipe units and construction of canal bridges.

BIDS: Nine bids were opened in Yuma, Ariz. on May 7, 1937. Three of these were for the complete work as required by Schedules 1 and 2; the remaining six were confined to Schedule 1 (all work exclusive of the steel pipe). In addition, five other bids were received for the steel pipe work only. The nine bids on Schedule 1 ranged from a low of $269,721 to a high of $399,713; the pipe bids as required by Schedule 2, from $109,737 to $156,595, including shipping costs.

CONDITIONS: The Government shipping point is Calexico, Cal. with all materials it furnishes to be hauled to the site by the contractors. Completion of the combined work is scheduled for 600 days with minimum hourly wages stipulated at $1.12½ for skilled and 45 c. for common labor.

MATERIALS FURNISHED: The Government furnishes f. o. b. Calexico, Cal. all cement and concrete materials, reinforcing, steel and wood piling, drain pipes and fittings; four end units of the pipe siphon to be installed by the concrete contractor; rubber water stops, rubber and cork fillers; all operating mechanisms; structural steel for highway bridge; lumber other than form and temporary construction; metal flume sheets, bituminous materials; miscellaneous metal work; electrical conduit, fittings, control cabinet; paint materials.

LOW BIDDERS: (Schedule 1)

1. Sharp & Fellows Contracting Co., Los Angeles, Cal.	$269,721
2. Gates & Huntley, Los Angeles, Cal.	299,232
3. Atlas Const. Co. & C. F. Robbins, Pasadena, Cal.	323,133

(Schedule 2)

1a. Southwest Welding & Mfg. Co., Alhambra, Cal.	109,737
2a. Pittsburgh Des Moines Steel Co., Des Moines, Ia.	115,000
3a. Western Pipe & Steel Co., Los Angles, Cal.	124,635

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation, structural	35,800 c. y.	$0.31	$0.25	$0.95
2. Excavation, backfill, piers	1,800 c. y.	3.25	7.00	1.25
3. Excavation, drainage ditches	4,700 c. y.	.22	.20	.50
4. Excavation, operating road	9,000 c. y.	.22	.30	.60
5. Excavation, river channel	8,000 c. y.	.33	.30	.65
6. Excav., temp. sect. drains	15,700 c. y.	.17	.20	.50
7. Excav., strip fdt. comp. banks	18,000 c. y.	.14	.20	.40
8. Overhaul sta. yd	10,000 c. y.	.015	.05	.015
9. Compacted embankments	144,000 c. y.	.245	.29	.55
10. Gravel, ext. slope, comp. bank	7,000 c. y.	1.85	2.50	2.00
11. Sand blankets under gravel	75 c. y.	1.90	3.00	2.00
12. Gravel blankets under concrete	3,000 c. y.	3.15	2.50	2.00
13. Gravel fills in concrete walls	300 c. y.	1.80	2.00	2.00
14. Backfill	25,400 c. y.	.17	.15	.25
15. Puddling, tamping backfill	1,800 c. y.	.60	1.00	.25
16. Concrete, structures	3,117 c. y.	14.15	18.00	11.00
17. Concrete in piers	1,720 c. y.	10.25	10.00	10.00
18. Concrete in canal lining	2,680 c. y.	9.30	8.00	7.00
19. Placing reinforcement bars	930,000 lb.	.0125	.016	.013
20. Installing rubber water stops	1,330 l. f.	.40	.60	.10
21. Install elastic joint filler	538 s. f.	.40	.50	.20
22. Precast-concrete crib members	202 c. y.	22.00	20.00	15.00
23. Dry-dock paving	150 s. y.	5.50	4.00	3.00
24. Riprap	487 c. y.	4.10	5.00	2.50
25. Drive steel sheet piling	181,940 lb.	.0125	.025	.015
26. Drive timber piles	3,180 l. f.	.62	.60	.45
27. Concrete piles, 30 ft	12 each	69.00	55.00	50.00
28. Concrete piles, 40 ft	255 each	92.00	71.00	80.00
29. Concrete piles, 45 ft	306 each	103.50	80.00	85.00
30. Sewer pipe, uncemented joints, 6 in	154 l. f.	.50	1.00	1.00
31. Cast-iron pipe drains, 6 in.	990 l. f.	.35	.70	1.00
32. Erect timber in structures	203 M.b.m.	26.00	75.00	35.00
33. Bituminous surface on bridge floors	440 s. y.	.65	1.00	2.00
34. Steel pipe, end units	38,000 lb.	.02	.03	.02
35. Bridge steel	81,600 lb.	.02	.02	.015
36. Install gates	40,700 lb.	.03	.05	.025
37. Install radial-gate mechanisms	15,640 lb.	.06	.05	.025
38. Install pipe handrails	3,200 lb.	.07	.06	.05
39. Erect metal flume No. 60	39 l. f.	1.50	5.00	5.00
40. Install steel pipe, 22 in. diam	8,300 lb.	.02	.03	.02
41. Install misc. metalwork	5,000 lb.	.08	.10	.08
42. Install electric conduits to 14 in	400 l. f.	.20	1.00	.15
43. Install electrical conductors	100 lb.	.50	1.00	.25
44. Welded plate steel pipe, 15.5 ft. (758 l. f.) inc. freight charges	540–85 ton	(1a) 187.58	(2a) 212.96	(3a) 216.75
45. Do. on U. S. B/L	540–85 ton	187.58	196.29	214.27

CANAL SIPHON, GILA RIVER

OWNER: U. S. Bureau Reclamation; L. J. Foster, Const. Engr., Yuma, Ariz.

PROJECT: Construction of circular concrete siphon, 19 ft. 6 in. dia., 2,200 ft. long, to carry Gravity Main irrigation canal under the Gila River ten miles east of Yuma on the Gila irrigation project. Canal prism excavation under another contract, except 685 ft. of canal with compacted embankment. Walls will be built under this contract at one end of siphon. Placement of compacted lining inside of canal and riprap protection for outside on sections adjacent to each end of siphon is under this contract. Siphon to be monolithic reinforced concrete structure built in trench; double row of steel sheeting will be driven under siphon barrel, anchored to base of barrel, to prevent underscour. Trench to be backfilled with both rock and earth.

CONDITIONS: Highway access to job; railroad siding 1½ miles away. Government furnishes cement, reinforcing and structural steel, rock, aggregates, gates, etc. for permanent works; contractor supplies all form lumber, temporary sheeting and bracing, cofferdam materials and all temporary materials. Minimum wages range from 50c. for common to $1.25 for skilled; most skilled trades set at $1.10; intermediate grade of labor from 60c. to 80c. Completion scheduled for 700 calendar days; penalty $50 day.

BIDS: Seventeen bids were opened Jan. 4, 1938, ranging from $337,376 to $771,397.

LOW BIDDERS:

1. Metropolitan Const. Co., Los Angeles	$337,376
2. J. F. Knapp, Oakland, Cal.	367,630
3. Winston Bros. Co., Los Angeles	433,130

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excav., common, struct.	5,300 c. y.	$0.35	$0.20	$0.60
2. Excav., rock, struct	650 c. y.	1.00	1.50	1.40
3. Excav., common, siphon	137,000 c. y.	.10	.20	.09
4. Excav., rock, siphon	100 c. y.	1.00	1.50	2.00
5. Excav., common, canal	40,000 c. y.	.20	.15	.16
6. Excav., rock, canal	100 c. y.	1.00	1.50	2.00
7. Overhaul	100,000 sta. y.	.01	.01	.01
8. Compacted embank	106,000 c. y.	.37	.40	.50
9. Compacted lining	19,400 c. y.	.45	.55	.95
10. Riprap	25,100 c. y.	1.00	1.25	1.45
11. Rockfill, siphon	43,900 c. y.	.80	1.20	1.10
12. Backfill, structural	30,000 c. y.	.15	.15	.15
13. Backfill, siphon	62,500 c. y.	.12	.12	.07
14. Compacted backfill	2,700 c. y.	1.00	.60	1.75
15. Concrete, structural	1,170 c. y.	20.00	16.00	22.30
16. Concrete, siphon	10,430 c. y.	10.00	9.00	15.00
17. Place reinf. steel	2,448,000 lb.	.012	.015	.014
18. Install rubber water stops	150 l. f.	.50	1.00	1.00
19. Install joint filler	220 s. f.	.25	.50	.25
20. Drive steel sheetpiling	1,768,500 lb.	.016	.015	.01
21. Construct timber railings	2.4 M.b.m.	40.00	50.00	75.00
22. Install pipe handrails	850 lb.	.10	.10	.07
23. Install gates, etc	56,000 lb.	.03	.03	.045
24. Install gate hoist	18,000 lb.	.05	.05	.03
25. Install misc. metal	13,500 lb.	.05	.08	.075
26. Install elect. conduit	275 l. f.	.50	.50	.40
27. Install. elect. conductors	50 lb.	.50	1.00	1.40

HEART MOUNTAIN CANAL, WYO.

OWNER: U. S. Bureau of Reclamation, Cody, Wyo.

PROJECT: Construction of earth work, lining and structures for the Heart Mountain Canal of the Shoshone project near Cody, Wyo. The work extends over a 7½-mile stretch, with the earth sections approximating 30 ft. in bottom width and 1½:1 sloped embankments rising 10 ft. The lined section, extending 2,000 ft., has a 7-ft. bottom width, and a 4-in. concrete lining sloping 1¼:1 to a 7½-ft. height.

BIDS: Four bids were opened August, 1937, ranging from $224,553 to $237,879. Completion is scheduled for 350 days; minimum hourly wages stipulated at $1.20 for skilled and 50c. for common labor, and the government furnishing f.o.b. Cody, Wyo., all cement, admixtures, reinforcing steel, concrete pipe for turnouts, sewer pipe, gates and gate hoists, valves, metalwork, and all miscellaneous materials entering into the completed project other than aggregates, backfill and items of construction required in the forming and prosecution of the work.

LOW BIDDERS:

1. James Crick, Spokane, Wash	$224,553
2. Morrison-Knudsen Co., Inc., Boise, Idaho	228,603
3. Taggart Const. Co., Cody, Wyo	237,879

Item	Quan.	Unit Prices (1)	(2)	
1. Canal excav., common	685,000 c. y.	$0.10	$0.092	$0.10
2. Canal excav., rock	98,500 c. y.	.10	.092	.25
3. Overhaul	26,500 c. y.	.02	.02	.02
4. Struct. excav., common	11,800 c. y.	.20	.30	[illegible]
5. Struct. excav., rock	650 c. y.	1.00	.75	1.00
6. Channel, dike excav. common	20,000 c. y.	.20	.12	.12
7. Channel, dike excav., rock	100 c. y.	1.00	.80	1.00
8. Compact embankment	44,500 c. y.	.10	.16	.15
9. Prepare rock fdt. for conc	2,350 s. y.	.40	.50	.50
10. Trim earth fdt. for conc	5,720 s. y.	.20	.30	.25
11. Structure backfill	26,600 c. y.	.20	.15	.15
12. Puddle, tamp backfill	11,300 c. y.	.25	.45	.40
13. Structure concrete	4,750 c. y.	18.00	19.50	16.00
14. Concrete canal lining	900 c. y.	14.25	12.00	15.00
15. Place reinforcing steel	1,115,500 lb.	.02	.02	.02
16. Dry rock paving	970 s. y.	1.00	2.00	2.00
17. Erect. struct. timber	9 M.b.m.	35.00	30.00	30.00
18. Uncmt'd. jt. drains, 6-in	1,850 l. f.	.30	.50	.50
19. Lay cmt. jt. drain, 6-in	400 l. f.	.40	.50	.40
20. Lay concrete pipe, 18-in	260 l. f.	.90	.85	.40
21. Lay concrete pipe, 24-in	40 l. f.	1.00	1.50	.50
22. Install valves, connections	4,000 lb.	.05	.05	.05
23. Install pipe handrails	1,730 l. f.	.05	.07	.05
24. Install gates, hoists	11,950 lb.	.05	.05	.05
25. Install stop plank guides	1,820 lb.	.05	.07	.05

SIPHON DROP TURNOUT ALL AMERICAN CANAL

OWNER: U. S. Bureau of Reclamation, L. J. Foster, Const. Engineer, Yuma, Ariz.

PROJECT: Construction of siphon drop turnout and drainage inlets for the All American Canal, Boulder Canyon Project, California.

BIDS: Three bids were opened November, 1937, ranging from $66,542 to $119,028, for Schedules I and II combined, with completion stipulated for the turnout inlet transition, gate section and barrels under Schedule I within 150 days; the remainder of the schedule within 200 days, and the work comprising Schedule II within 120 days. Minimum hourly wages are $1.25 for skilled and 60c. for common labor. Contractor furnishes form materials and everything not entering into the completed construction, water, backfill, dry rock paving and riprap, labor and hauling of all materials required for the completed project.

LOW BIDDERS:

1. Norman I. Fadel, Los Angeles, Calif	$66,542
2. Bennett & Taylor, Los Angeles, Calif	95,107
3. Gates & Huntley, Los Angeles, Calif	119,028

Item	Quan.	Unit Prices (1)	(2)	(3)
SCHEDULE I				
1. Structural excav	23,700 c. y.	$0.25	$0.65	$0.70
2. Enlargement excav., Yuma Canal	7,500 c. y.	.50	.55	.50
3. Excav., raising banks, Yuma Canal	15,900 c. y.	.20	.27	.50
4. Overhaul	43,400 sta. c. y.	.015	.025	.03
5. Compacted subbase	500 c. y.	.50	1.25	2.00
6. Backfill, structures	7,500 c. y.	.18	.15	.50
7. Puddling backfill	1,250 c. y.	.40	.50	1.00
8. Conc., structures	1,460 c. y.	14.50	16.00	26.00
9. Place reinf. bars	250,000 lb.	.02	.0225	.04
10. Install elastic joint filler	370 s. f.	.30	.75	1.00
11. Install rubber water stops	365 l. f.	.50	.75	1.00
12. Dry-dock paving	250 s. y.	3.50	3.00	4.00
13. Gravel blanket under riprap	260 c. y.	3.00	3.50	5.00
14. Riprap	1,154 c. y.	5.00	4.40	4.00
15. Construct reverse filters	116 c. y	2.50	2.50	5.80
16. Lay open joint c. i. Pipe, 4 in., 6 in. diam	1,000 lb.	.10	.10	.10
17. Install c. i. pipe, threaded con's	900 lb.	.10	.15	.10
18. Drive steel sheet piling	253,000 lb.	.016	.03	.025
19. Install pipe handrails	550 lb.	.10	.20	.10
20. Install gate, gate hoists	25,700 lb.	.07	.035	.10
21. Install Misc. Metalwork	5,100 lb.	.10	.09	.10
22. Electric met. conduit, 1 in. diam	250 l. f.	.50	.30	1.00
23. Electric met. conduit, 1 in. diam., or more	50 l. f.	.50	.40	1.00
SCHEDULE II				
24. Structural excav	1,200 c. y.	0.70	4.00	1.50
25. Backfill	730 c. y.	.40	1.50	1.00
26. Tamping backfill	265 c. y.	.50	2.00	1.00
27. Concrete, structures	265 c. y.	14.50	21.15	30.00
28. Place reinf. bars	27,200 lb.	.02	.04	.05
29. Dry dock paving	1,100 s. y.	3.50	7.00	4.00
30. Riprap	80 c. y.	5.00	10.00	5.00
31. Rubber water stops	86 l. f.	.50	1.25	2.00

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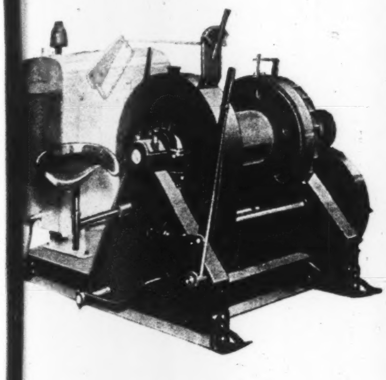

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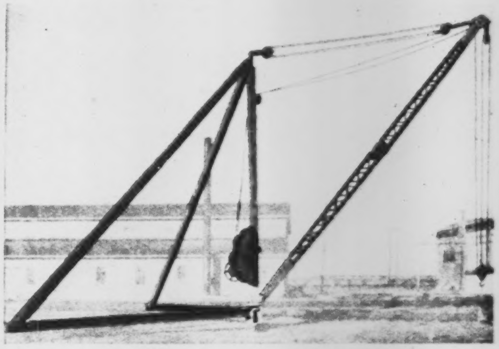

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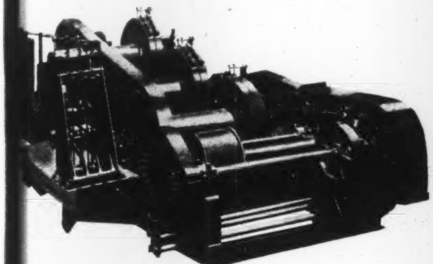

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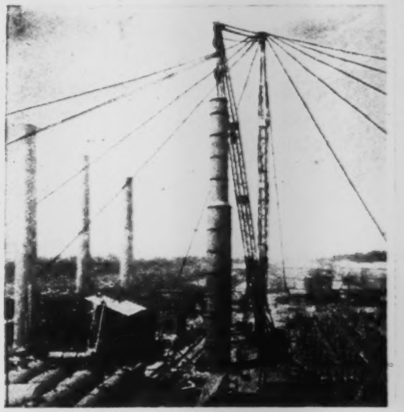

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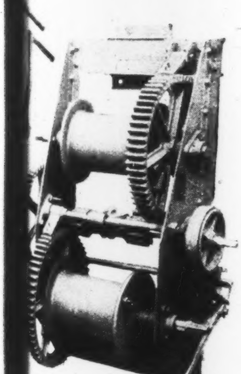

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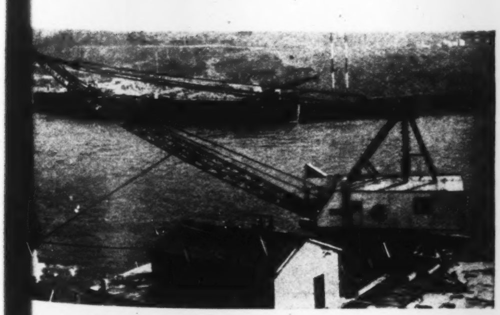

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YAKIMA RIDGE CANAL, WASHINGTON

OWNER: Bureau of Reclamation, Dept. of Interior.

PROJECT: Construction of about 5 miles of canal, including 9,135 lin. ft. of lined section and 700 lin. ft. of bench flume for the Yakima Ridge Canal project, paralleling the Yakima River in Washington. The lined section is of 4 in. concrete, 12 ft. bottom width, with 1¼:1 slope rising about 10.5 ft. The bench flume is 25.5 x 11 ft. overall, with 7 in. to 12 in. concrete sides and bottom. The earth section is 9.5 ft. deep, with 40 ft. bottom width and sides of 1½:1 slope.

BIDS: Eleven proposals were opened at Yakima, Wash. on May 7, 1937, ranging from a low of $175,137 to a high of $246,084.

CONDITIONS: The site of the work is from ½ to 2 miles north of the N.P.R.R. with highways a similar distance. Completion is scheduled for 350 days after contract award with minimum hourly wages stipulated of $1.20 for skilled and 50c. for common labor.

MATERIALS FURNISHED: Government furnishes f. o. b. siding designated, all materials entering into the completed structures, exclusive of backfill, crushed rock for rock paving, inside slope gravel, stone for highway surfacing, and materials not forming a part of the completed work.

LOW BIDDERS:

1. H. J. Adler Const. Co. Caldwell, Idaho	$175,137
2. J. A. Terteling & Sons, Boise, Ia.	178,727
3. Northwest Const. Co. Seattle, Wash.	180,047

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation, canal, com.	445,000 c. y.	$0.125	$0.13	$0.16
2. Excavation, canal, rock	8,000 c. y.	.50	.30	1.00
3. Excavation, core banks	56,500 c. y.	.15	.18	.15
4. Overhaul, sta. yd	158,000 c. y.	.03	.02	.01
5. Excavation, struct. com	8,300 c. y.	.35	1.00	.50
6. Excavation, struct. rock	100 c. y.	2.00	1.00	2.50
7. Excav. channels, dikes, com.	1,000 c. y.	.15	.75	.50
8. Excav. channels, dikes, rock	100 c. y.	.60	.75	1.50
9. Compacting embankment	17,500 c. y.	.20	.25	.10
10. Foundation prep., rock	100 s. y.	.50	.60	.60
11. Foundation prep., earth	45,200 s. y.	.35	.30	.10
12. Gravel, blanket, canal slope	1,085 c. y.	1.00	1.00	1.00
13. Backfill	4,000 c. y.	.20	.20	.25
14. Puddle, backfill	2,000 c. y.	.40	.40	.40
15. Concrete, structural	590 c. y.	16.00	16.00	15.00
16. Bench flume concrete	1,065 c. y.	9.80	8.00	10.00
17. Canal lining concrete	5,150 c. y.	7.90	7.50	8.50
18. Set reinforcing steel	600,700 lb.	.015	.015	.015
19. Dry rock paving	200 s. y.	2.00	1.00	2.00
20. Erect bridge steel	18,400 lb.	.05	.03	.04
21. Erect bridge timber	9 M.b.m.	20.00	20.00	25.00
22. Bituminous bridge surf.	76 s. y.	2.00	2.00	3.00
23. Lay conc. pipe, 12 in	420 l. f.	.75	1.00	.50
24. Construct underdrain, 6 in.	9,500 l. f.	.50	.75	.20
25. Do. underdrain, cmt. joints	1,900 l. f.	.30	.50	.25
26. Install gates	1,350 lb.	.05	.05	.05

IRRIGATION CANALS, MONTANA

OWNER: Bureau of Reclamation, Dept. Interior; R. F. Walker, Chief Engineer.

PROJECT: Construction of earthwork and structures for Sun River Slope laterals near Fairfield and Augusta, Mont., including installation of 2,200 lin.ft. 15 to 30 in. concrete and metal flume, gates and misc. metal work.

BIDS: Nine bids were submitted July, 1937, ranging from the low of $65,774 to a high of $98,881; completion scheduled for 400 days after contract award. Minimum hourly wages stipulated at $1.20 for skilled and 50c for common labor.

CONDITIONS: Govt. furnishes all material f.o.b. Fairfield, exclusive of concrete aggregates, sand for grout, backfill and gouted paving, form materials, and in general all materials not entering into the finish construction.

LOW BIDDERS:

1. Otis Williams & Co., Vale, Ore.	$65.7
2. E. C. Powell, Missoula, Mont.	70.8
3. Dan Teters & Co., Ogden, Utah	75.0

SCHEDULE I

Item	Quan.	Unit Prices (1)	(2)	
1. Excav. laterals, unclass	42,000 c. y.	$0.16	$0.19	[illegible]
2. Overhaul	5,300 c. y.	.04	.05	[illegible]
3. Excav. struct. unclass	3,300 c. y.	1.00	1.00	[illegible]
4. Backfill, structures	3,150 c. y.	.25	.21	[illegible]
5. Structure puddling	1,100 c. y.	.30	.20	[illegible]
6. Concrete	730 c. y.	20.00	22.00	[illegible]
7. Place reinf. bars	52,000 lb.	.03	.02	[illegible]
8. Grouted paving	550 s. y.	2.00	2.50	[illegible]
9. Dry dock paving	180 s. y.	1.00	1.00	[illegible]
10. Erect struct. timber	3 m. b. m.	16.00	40.00	[illegible]
11. Lay conc. pipe, 15 in	328 l. f.	.50	.50	[illegible]
12. Lay conc. pipe, 18 in	320 l. f.	.60	.50	[illegible]
13. Lay conc. pipe, 24 in	80 l. f.	1.00	.50	[illegible]
14. Lay conc. pipe, 30 in	8 l. f.	1.50	.50	[illegible]
15. Lay c. m. pipe, 15 in	50 l. f.	.20	.50	[illegible]
16. Lay c. m. pipe, 21 in	220 l. f.	.40	.50	[illegible]
17. Lay c. m. pipe, 30 in	20 l. f.	.50	.50	[illegible]
18. Instal gates, misc. metal	13,700 lb.	.05	.04	[illegible]

SCHEDULE II

Item	Quan.	(1)	(2)	
19. Excav. laterals, unclass	27,000 c. y.	.16	.19	[illegible]
20. Overhaul	2,200 c. y.	.04	.05	.04
21. Excav. struc. unclass	2,300 c. y.	1.00	1.00	1.25
22. Backfill, structs	2,300 c. y.	.25	.21	[illegible]
23. Struct. puddling	700 c. y.	.30	.30	.50
24. Concrete	450 c. y.	20.00	22.00	20.00
25. Place reinf. bars	31,000 lb.	.03	.02	[illegible]
26. Grouted paving	350 s. y.	2.00	2.50	2.00
27. Dry dock paving	100 s. y.	1.00	1.00	1.50
28. Erect struct. timber	2 m. b. m.	16.00	40.00	40.00
29. Lay conc. pipe, 15 in	128 l. f.	.50	.50	1.00
30. Lay conc. pipe, 18 in	284 l. f.	.60	.50	1.50
31. Lay conc. pipe, 24 in	8 l. f.	1.00	.50	2.00
32. Lay conc. pipe, 40 in	40 l. f.	1.50	.50	[illegible]
33. Lay c. m. pipe, 15 in	20 l. f.	.20	.50	[illegible]
34. Lay c. m. pipe, 21 in	150 l. f.	.40	.50	.50
35. Lay c. m. pipe, 30 in	70 l. f.	.50	.50	.75
36. Instal gates, misc. metal	10,000 lb.	.05	.04	.04

SCHEDULE

Item	Quan.	(1)	(2)	
37. Excav. lateral, unclass	23,000 c. y.	.16	.19	.18
38. Overhaul	1,700 c. y.	.04	.05	.04
39. Excav. struct. unclass	1,600 c. y.	1.00	1.00	1.25
40. Backfill, structs	1,750 c. y.	.25	.30	.30
41. Struct. puddling	600 c. y.	.30	.30	.50
42. Concrete	410 c. y.	20.00	22.00	20.00
43. Place reinf. bars	27,700 lb.	.03	.02	.03
44. Grouted paving	320 s. y.	2.00	2.50	2.00
45. Dry rock paving	70 s. y.	1.00	1.00	1.50
46. Erect struct. timber	4 m. b. m.	16.00	40.00	40.00
47. Erect metal flume, No. 72	93 l. f.	1.00	1.00	1.50
48. Lay conc. pipe, 15 in	140 l. f.	.50	.50	1.00
49. Lay conc. pipe, 18 in	124 l. f.	.60	.50	1.25
50. Lay conc. pipe, 24 in	100 l. f.	1.00	.50	1.50
51. Lay conc. pipe, 30 in	16 l. f.	1.50	.50	2.00
52. Lay c. m. pipe, 15 in	50 l. f.	.20	.50	.35
53. Lay c. m. pipe, 21 in	80 l. f.	.40	.50	.50
54. Lay c. m. pipe, 30 in	30 l. f.	.50	.50	.75
55. Instal. gates, misc. metal	7,000 lb.	.05	.04	.04

LEVEE CONSTRUCTION, CALIF.

OWNER: U. S. War Dept. Sacramento, Calif., Lt.-Col. L. B. Chambers, dist. eng.

PROJECT: Raising, strengthening and construction of 12 miles of levee on the Sacramento River, Cal., at Yolo bypass from Fremont weir to Sacramento Northern R.R., Knights Landing ridge cut, and training and south levees of Cache Creek.

BIDS: Six bids were received on each of the two sections into which the project is divided, and nine bids were received for the combined work in May 1937, ranging for the combined work from the contract low of $115,598 to a high of $199,757.

CONDITIONS: Work is scheduled for completion in October, 1938, at average monthly prosecution of 120,000 c.y.; minimum hourly wages stipulated at $1.25 for skilled and 60c. for common labor, and the contractor furnishing all labor, material and equipment.

LOW BIDDERS:

1. Haas, Doughty & Jones, and Marshall & Stacy, San Francisco, Cal. (contract)	$115,598
2. J. P. Immel, Ventura, Cal	135,354
3. D. McDonald, Sacramento, Cal	150,760

UNIT BID PRICES—LEVEES

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Levee embankment	1,264,000 c. y.	$0.0685	$0.0836	$0.097
2. Road gravel	182 c. y.	2.00	2.00	3.00
3. Concrete, Cl. A	51 c. y.	35.00	20.00	30.00
4. Reinforcing steel	2,995 lb.	.10	.10	.07
5. Corr. pipe, 12 ga., 18 in., coupler	52 l. f.	4.00	3.95	4.00
6. Corr. pipe, 12 ga., 24 in., coupler	1,858 l. f.	5.00	5.00	4.70
7. Corr. pipe, 10 ga., 36 in., coupler	294 l. f.	9.00	9.66	8.00
8. Corr. pipe, 10 ga., 42 in., coupler	700 l. f.	10.00	12.20	10.00
9. Corr. pipe, 10 ga., 48 in., coupler	290 l. f.	12.00	13.39	12.00
10. C. I. cutoff sheets, 12 ga., 49½x50 in	14 ea.	15.00	11.00	12.00
11. C. I. cutoff sheets, 12 ga., 60½x60 in	6 ea.	20.00	15.60	18.00
12. C. I. cutoff sheets, 12 ga., 73½x70 in	14 ea.	25.00	20.00	23.00
13. C. I. cutoff sheets, 12 ga., 42 in. pipe	4 ea.	25.00	20.00	25.00
14. Auto. drainage gate, 2x14 ft	1 ea.	150.00	133.13	150.00
15. Auto. drainage gate, 2x18 ft	1 ea.	150.00	133.13	155.00
16. Auto drainage gate, 3x20	1 ea.	300.00	266.55	300.00
17. Auto. drainage gate, 3x16 ft	1 ea.	300.00	266.55	300.00
18. Auto. drainage gate, 3½x20 ft	3 ea.	425.00	382.10	450.00
19. Auto. drainage gate, 3½x6 ft	4 ea.	125.00	98.85	130.00
20. S. H. gate, 24 in., 6 ft. frame	1 ea.	50.00	41.33	50.00
21. S. H. gate, 48 in., 8 ft. frame	1 ea.	130.00	113.41	150.00
22. Auto. drainage gate, 24 in.	4 ea.	45.00	57.00	75.00
23. Auto. drainage gate, 36 in.	1 ea.	100.00	71.55	100.00
24. Wooden spill box	260 b. f.	.10	.10	.08

LEVEES, SACRAMENTO RIVER

OWNER: U. S. Engineer Department, Sacramento, Calif.

PROJECT: Construction of levee along left bank of Sacramento River between Colusa Weir and Moulton Weir, with borrow from areas as designated below.

BIDS: Five bids were opened in October 1937 ranging from $10.236 to $19.592.

LOW BIDDERS:

1. C. C. Wood, Hobart Mills, Calif.	$10.236
2. Hemstreet & Bell, Marysville, Calif.	11.394
3. Olympian Dredging Co., San Francisco, Calif.	14.213

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Embankment, Area-1a	4,900 c. y.	$0.264	$0.34	$0.41
2. Embankment, Area-2a	900 c. y.	.35	.39	.40
3. Embankment, Area-2a	26,500 c. y.	.30	.31	.39
4. Embankment, Area-3a	2,900 c. y.	.22	.38	.41
5. Water	20 M. g.	2.00	3.00	16.00

LEVEES, MAGNOLIA, OHIO

OWNER: U. S. Engineer Department; Col. J. D. Arthur, Jr., Dist. Engineer, Zanesville, O.

PROJECT: Construction of an earth levee, 4,560 ft. in length, on Big Sandy Creek, near Magnolia, Ohio.

BIDS: Seven bids were opened in July, 1937, ranging from $161,725 to $235,950. Completion is scheduled for 180 days after contract award; minimum hourly wages stipulated at $1.20 for skilled and 50c. for common labor. The contractor furnishes all labor and materials exclusive only of the raising of the abutments and the bridge over Big Sandy Creek on State Route 80, and the three centrifugal pumps with equipment at the pumping station.

LOW BIDDERS:

1. Nick Cenci, Columbus, Ohio	$161,725
2. Geo. M. Brewster & Son, Inc., Bogota, N. J.	175,875
3. Ralph Myers, Salem, Ind.	180,472

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Diversion, care canal	l. s.	$1,500.00	$2,100.00	$3,000.00
2. Remove old structures	l. s.	200.00	140.00	500.00
3. Clear, grub levee site	l. s.	500.00	973.60	1,800.00
4. Stripping	22,500 c. y.	.25	.294	.25
5. Excav., common	18,000 c. y.	.30	.364	.50
6. Borrow excav., haul	286,000 c. y.	.27	.262	.33
7. Impervious fill	107,000 c. y.	.06	.064	.01
8. Pervious fill	145,000 c. y.	.06	.062	.01
9. Top soil	15,000 c. y.	.25	.31	.35
10. Seed, fertilize	16 acre	250.00	175.00	156.50
11. Struct. backfill, comp	4,100 c. y.	.25	.75	.50
12. Riprap	800 c. y.	8.00	4.27	5.00
13. Gravel filter	500 c. y.	2.50	1.82	2.75
14. Gravel road surfacing	350 s. y.	2.50	.784	.65
15. Concrete	600 c. y.	14.00	20.40	18.00
16. Reinf. steel	36,000 lb.	.05	.055	.06
17. Gal. corr. pipe, 36-in	900 l. f.	9.85	12.60	12.00
18. Gal. corr. perf. pipe, 48-in	500 l. f.	13.32	17.25	15.00
19. Discharge pipe, pumps	26,500 lb.	.07	.10	.10
20. Seep rings, 36 in	9 ea.	142.50	189.60	250.00
21. Gates, accessories	l. s.	1,585.00	2,778.00	1,500.00
22. Misc. metal work	15,700 lb.	.16	.182	.15
23. Electric conduit	400 lb.	.30	.40	.60
24. Light, power system	L. S.	400.00	200.00	265.00
25. Pump station superstr	L. S.	7,000.00	8,500.00	10,000.00

CALIFORNIA LEVEES

OWNER: U. S. War Department, Sacramento, Calif.

PROJECT: Construction of 11 miles of levees, involving 890,000 c.y., of fill along Bear River, South Dry Creek Lateral, Grasshopper Creek, and excavation along Grasshopper Creek Diverting Channel, forming part of the Sacramento River Flood Control project.

BIDS: Nine bids were opened in September, 1937, ranging from the contract low of $119,947 to a $202,084, with completion scheduled for October, 1938, and minimum hourly wage rates stipulated of 62½c. for common and $1.25 for skilled labor.

LOW BIDDERS:

1. Morrison-Knudsen Co., Los Angeles, Calif. (contract)	$119,947
2. D. McDonald, Sacramento, Calif.	128,340
3. Macco Construction Co., Clearwater, Calif.	130,414

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Levee embankment	867,000 c. y.	$0.103	$0.104	$0.109
2. Excavation	22,200 c. y.	.07	.20	.136
3. Road gravel	790 c. y.	1.00	3.00	2.00
4. Concrete, cl. A	21 c. y.	30.00	40.00	35.00
5. Reinforcing steel	1,200 c. y.	.07	.08	.08
6. Corr. pipe, 8 in., 14 ga	150 l. f.	1.80	2.10	2.15
7. Corr. pipe, 18 in., 12 ga.	1,866 l. f.	4.30	4.70	4.50
8. Corr. pipe, 24 in., 12 ga	382 l. f.	5.70	6.10	5.00
9. Corr. pipe, 30 in., 12 ga.	94 l. f.	7.00	7.80	8.25
10. Corr. pipe, 36 in., 10 ga.	622 l. f.	10.00	10.90	12.00
11. Corr. pipe, 48 in., 11 ga.	170 l. f.	14.00	15.70	16.00
12. Corr. cutoff sheet, 8 in. pipe	4 each	7.00	7.00	7.00
13. Corr. cutoff sheet, 18 in. pipe	40 each	11.50	12.00	11.50
14. Corr. cutoff sheet, 24 in. pipe	6 each	11.50	12.00	12.50
15. Corr. cutoff sheet, 30 in. pipe	2 each	17.50	19.00	18.00
16. Corr. cutoff sheet, 36 in. pipe	12 each	24.00	27.00	25.00
17. Corr. cutoff sheet, 48 in. pipe	2 each	31.00	33.00	30.00
18. Slide head gate, 18 in., 8 ft. frame	2 each	38.00	40.00	45.00
19. Slide head gate, 18 in., 6 ft. frame	4 each	35.50	39.00	40.00
20. Slide head gate, 24 in., 8 ft. frame	1 each	50.00	51.00	55.00
21. Slide head gate, 36 in., 12 ft. frame	2 each	106.50	103.00	110.00
22. Auto. drain. gate, 8 in	2 each	9.00	14.00	11.00
23. Auto. drain. gate, 18 in	14 each	33.00	34.00	40.00
24. Auto. drain. gate, 24 in	3 each	54.00	54.00	65.00
25. Auto. drain. gate, 30 in	1 each	125.00	111.00	120.00
26. Auto. drain. gate, 36 in	4 each	146.50	131.00	140.00
27. Auto. drain. gate, 48 in	1 each	400.00	530.00	375.00
28. Embankment protector	2 each	14.50	25.00	15.00
29. Galv. iron flange, 2 in. air vents	8 each	2.70	3.00	3.00
30. Galv. iron pipe, 2 in. air vents	63 l. f.	.37	.50	.36
31. Corr. pipe, 24 in. gate, remove	1 each	15.00	50.00	100.00
32. Concrete spillway, headwall, demolish	20 c. y.	6.00	5.00	5.00
33. Oil road surface, remove	260 s. y.	.25	.20	.10
34. Corr. pipe, 12 in., remove, reinstall	30 l. f.	.50	1.00	1.00
35. New fencing	41,585 l. f.	.075	.101	.10

HIGH OUTPUT

FASTER from job to job—and on the job

MICHIGAN 3/8 YD. and 1/2 YD. TRUCK SHOVELS—CRANES

Two heavy-duty machines with the economy and mobility of an ordinary truck. Built all the way through for continuous hard, high-speed service. Available in two sizes — 3/8 yard or 1/2 yard capacities.

MECHANICAL FEATURES

FINGERTIP AIR CONTROLS — Positive smoothness. Shafts turn on anti-friction ball and roller bearings.

FULL CIRCLE LOADING—Turntable mechanism stabilized by ball-bearing top and hook rollers. Tubular boom combines lightness with extra strength.

MOTIVE POWER—3/8 yard model—Heavy duty 6 cylinder Industrial Motor. Supplies power for both truck and shovel.

1/2 yard model—JXD 6 cylinder motor, 55 h.p. at 1500 r.p.m. Supplies power for turntable mechanism. Six cylinder Hercules or Waukesha motor, 100 h.p. at 2500 r.p.m furnishes power for chassis.

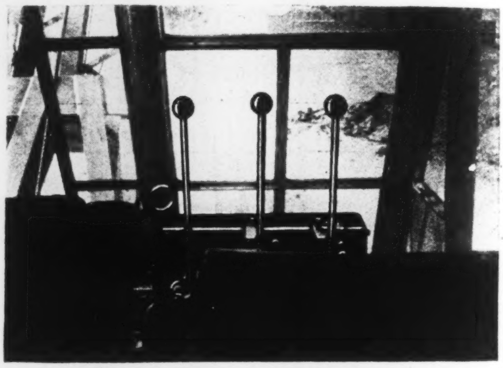
ROAD SPEED—25 miles per hour.

SAFETY—Lockheed hydraulic brakes — safety vacuum reservoir — separate emergency brake on drive shaft — turntable equipped with safety pawl and powerful brake.

FRAME—13-inch high-tensile special alloy steel.

For further information and complete specifications on these two versatile machines, write for Bulletins ET6D and EMTC16.

MICHIGAN POWER SHOVEL CO.
Benton Harbor Michigan, U. S. A.

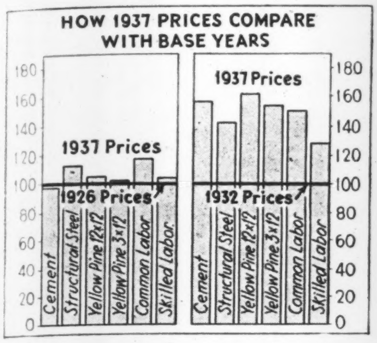


AIR CONTROLS—High Speed—low fatigue

Above: TRENCH HOE Below: DRAGLINE

Prices of Construction Materials

HOW 1937 PRICES COMPARE WITH BASE YEARS



In general, prices of construction materials rose sharply during the first half of 1937, reaching a peak by midsummer or early fall, then tapered off in a slow decline that continued through the spring of 1938. The recent trend has been mixed: some commodity prices have leveled off, others are dropping slowly, while a few show signs of stiffening. Naturally, prices of construction materials have a direct bearing on construction costs, but because of the phenomenal rise in labor rates last year the construction cost curve went steadily upward. However, since the start of 1938 labor rates have leveled off, and consequently construction costs have followed the slight downward trend of materials prices.

A review of price trends of various construction materials for the past eighteen months, based on the average of twenty cities, shows a fairly uniform pattern—a rise during the first half of 1937 and a slight decline from early last fall to date. Cement prices fluctuated somewhat in 1937, reaching a low in November, but recovered to the January, 1937, level only recently. Reinforcing steel registered an early 1937 price rise, held steady for the remainder of the year, dropped some this past spring, but stiffened again last month. The structural steel base price jumped from $2.05 to $2.25 in April, 1937, and has remained at that figure to date.

Concrete aggregate prices dropped in the summer of 1937, between spring and fall rises, and have risen slightly during the first half of 1938. Lumber rose in price during the spring of 1937 to a peak in midsummer, only to decline to the year's opening price levels in December, a decline that has continued in 1938, the current price being down to mid-1935 levels.

The price of brick rose early in 1937, again later that year and in the spring of 1938, but has broken somewhat in the past few weeks. Paving asphalt prices rose early last year, but encountered a slow drop during the fall that has continued to date.

Accompanying tables and charts on this page show average annual prices of basic commodities from 1874 to date, index figures of building materials prices for the past ten years, and a comparison of 1937 price levels with those of 1932 and 1926. The following eight pages give spot prices of principal materials in twenty cities as of December, 1937, and June, 1938, also charts showing the 1937 trend of prices of representative products.

Basic Building Materials Prices

1874 to 1937 in New York City

Average yearly prices at New York, except in the case of steel, which is f.o.b. Pittsburgh mill: wrought-iron I beams for years, 1879, 1885 and 1886. Brick, wholesale, f.o.b. Lime, common lump, wholesale, f.o.b., 180 lb., net., 1910–15, incl.; afterward, 280 lb. Cement, net, delivered; Rosendale, 1874 to 1878, incl.; afterward, Portland. Lumber, No. 1 com., rough, wholesale, at dock, for 1 in., yel. pine, 1874 to 1909, incl.; afterward, 3 in., long-leaf to 1913, incl. *LLYP–3x12—from Lumber Trade Journal. †LLYP–12x12 as reported to Engineering News-Record. Cast iron pipe price per ton f.o.b. Delaware River foundries; prices prior to 1901 are for all classes of bell and spigot; prices subsequent to 1901 are for 6-in. and larger Cl. B or heavier bell and spigot; early prices from "Price History of Cast Iron Pipe," by United States Cast Iron Pipe and Foundry Co.; prices 1850, $35.72; 1855, $40.18; 1860, $32.15; 1865, $58.05; 1870, $50.

	Brick Common Per M	Cement Per Bbl	Lime Per Bbl	Pine per M. Ft. B.m.		Steel Shapes, Per 100 Lb.	Cast Iron Pipe, Per Ton
1874	$7.41	$1.48	$1.50	$26.00			$43.76
1875	7.12	1.25	1.40	21.00			37.51
1876	5.87	1.20	1.00	21.00			31.26
1877	4.93	1.10	.80	20.00			25.00
1878	4.71	.95	.70	20.00			23.22
1879	4.08	2.70	.80	20.96		$2.78	29.47
1880	7.00	2.88	.87	19.00			29.47
1881	7.50	2.72	.95	19.00			33.04
1882	7.12	2.82	1.01	19.00			35.68
1883	8.28	2.75	1.05	19.00			32.15
1884	6.65	2.60	.95	19.00			26.79
1885	6.10	2.28	1.00	18.66		3.12	25.00
1886	7.51	2.28	1.00	19.00		3.00	26.79
1887	7.43	2.07	.82	19.00			28.58
1888	6.50	2.16	.83	16.75			25.00
1889	7.06	2.23	.92	20.31			23.04
1890	6.65	2.25	.95	21.75			24.65
1891	5.53	2.38	.87	18.00			23.04
1892	5.77	2.27	.93	18.50			21.43
1893	5.83	2.15	.93	18.50			21.30
1894	5.00	2.03	.85	18.50		1.20	18.47
1895	5.31	1.97	.78	16.92		1.35	17.95
1896	5.06	2.00	.69	16.42		1.60	17.64
1897	4.94	1.97	.72	16.44		1.24	15.48
1898	5.75	2.00	.70	15.75		1.27½	15.48
1899	5.69	2.05	.75	16.25		1.45	21.17
1900	5.25	2.16	.68	24.50		1.95	22.33
1901	5.77	1.89	.77	17.50		1.60	21.63
1902	5.39	1.95	.81	21.00		1.60	26.62
1903	5.91	2.03	.79	23.50		1.70	27.56
1904	7.50	1.67½	.80	21.50		1.60	22.92
1905	8.40	1.43	.89	24.92		1.62	26.54
1906	8.55	1.55	.95	29.33		1.60	30.12
1907	6.16	1.55	.95	30.50		1.75	31.52
1908	5.10	1.46	1.05	30.50		1.76	24.69
1909	6.39	1.41	1.05	33.04		1.50	24.19
1910	5.70	1.07	.75	24.00		1.46	22.99
1911	5.31	1.04	.75	24.63		1.36	19.99
1912	6.75	.97	.75	24.92		1.33	21.22
1913	6.75	1.18	.91½	* 25.04 †		1.50	21.96
1914	5.50	1.17½	.97	21.79	29.25	1.16	20.37
1915	5.50	1.00	.97	21.68	27.91	1.28	22.52
1916	8.00	1.32	1.50	27.60	31.58	2.45	30.25
1917	9.10	1.76	2.02	38.00	37.81	3.62	52.33
1918	10.98	2.48	2.16	46.68	43.33	3.00	58.68
1919	15.79	2.63	2.65	57.04	49.60	2.52	53.87
1920	18.00	3.52	3.15	71.17	66.50	2.45	71.77
1921	17.40	2.82	3.47	50.67	51.54	2.00	50.58
1922	16.91	2.43	2.79	49.41	51.83	1.70	46.42
1923	20.00	2.66	2.98	61.77	62.25	2.39	57.75
1924	18.00	2.50	2.88	55.17	59.00	2.19	54.33
1925	15.00	2.50	2.38	57.00	59.67	1.95	49.16
1926	17.00	2.50	2.18	60.33	62.17	1.93	48.50
1927	15.00	2.40	2.49	62.57	61.46	1.86	41.42
1928	14.00	2.30	2.30	63.33	61.34	1.87	35.92
1929	11.71	2.23	2.25	64.50	63.00	1.92	36.66
1930	10.88	2.19	2.25	64.33	60.64	1.71	37.00
1931	10.29	1.89	2.25	58.17	53.02	1.63	34.71
1932	9.75	1.62	2.25	39.91	41.33	1.56	30.58
1933	9.50	2.26	2.50	46.25	46.79	1.64	34.58
1934	10.87	2.48	2.50	57.17	58.92	1.78	41.00
1935	11.00	2.15	2.35	51.67	53.75	1.80	42.58
1936	12.00	2.26	2.80	56.75	57.75	1.84	43.00
1937	12.50	2.47	2.80	61.50	66.46	2.21	48.33

INDEX NUMBERS OF WHOLESALE PRICES—BUREAU OF LABOR STATISTICS

(1926—100)	1937	1936	1935	1934	1933	1932	1931	1930	1929	1928
Building materials	95.2	86.7	85.3	86.2	77.0	71.4	79.2	89.9	95.4	94.1
Brick and tile	93.5	88.7	89.4	90.2	79.2	77.3	83.6	89.8	94.3	95.6
Cement	95.5	95.5	95.3	93.2	86.1	77.2	79.4	91.8	91.8	95.9
Lumber	99.0	84.5	81.1	84.5	70.7	58.5	69.5	85.8	93.8	90.5
Paint and paint materials	83.4	80.1	79.8	79.5	73.3	71.1	79.4	90.5	94.9	93.1
Plumbing and heating	78.8	75.0	68.9	72.6	67.1	66.8	84.7	88.6	95.0	95.1
Structural steel	113.2	95.0	92.0	90.8	83.1	80.9	83.1	87.3	98.1	95.2
Other building materials	99.1	90.2	90.1	90.3	82.7	79.5	84.8	93.3	97.7	96.7

MATERIALS PRICES—DECEMBER, 1937

Market quotations on construction materials and wage rates reported monthly by ENR correspondents

FOR the third successive month lower lumber prices are the principal change. Southern Pine prices are 50c. to $1.00 lower in Atlanta and St. Louis; $3.00 to $5.00 lower in Detroit. Two-inch planks are down $1.00 in Kansas City. In Boston, Roofers' North Carolina pine is down $1.00; 2 x 6-in. Spruce is up $2.00; and 2 x 8-in. Long Leaf Pine is $2.00 lower. Fir timber prices are $1.00 lower in Detroit and St. Louis; $1.00 to $3.00 in Kansas City; and $1.00 to $2.00 in New York. One-inch fir planks are off $1.00 in Kansas City and Boston. The Seattle base price on plywood is down, $59.50 per 1,000 sq. ft. for the ⅝-in., and $67.90 for the ¾-in. size.

Cement prices are up 4c. in Atlanta and Birmingham, and 3c. in Cincinnati, due to increased freight rates. Detroit's cement price is 5c. lower. Sand and gravel is 20c. higher in Chicago, and sand is 10c. higher in Philadelphia. Granite paving brick is $5.00 lower in Boston. Higher freight rates add 1c. per cwt. to structural shapes, reinforcing bars and sheet piling in Detroit.

Skilled labor in Atlanta which previously ranged from 40c. to $1.00 for carpenters, $1.00 to $1.25 for structural ironworkers, has closed up this span with the top rates now prevailing. Chicago ironworkers' rate is up 7.5c. to $1.70 and the St. Louis plasterers' rate is 8c. higher, or $1.58.

CEMENT, AGGREGATES, READY-MIXED CONCRETE—F.O.B. CITY

	PORTLAND CEMENT Per bbl., carload lots, including 40c per bbl. for bags, cash discount not included			SAND AND GRAVEL Per ton, carload lots			CRUSHED STONE Per ton, carload lots		CRUSHED SLAG Per ton, carload lots, f.o.b. plant		CONCRETE Ready Mixed 1:2:4, 50 c.y. or more, delivered
	Cloth Bags a	Paper Bags	Bulk	Gravel, 1½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	
Atlanta	$2.89	$2.62	$2.54	$1.65	$1.75	$1.55	$1.55	$1.65	$1.55	$1.65	$8.90
Baltimore	2.31	2.06	1.86	1.80‡	1.80‡	1.30‡	1.30‡	1.30‡	1.80‡	1.80‡	7.35
Birmingham	2.44	2.19	1.99	1.80	1.80	1.45	1.00	1.00	.90	1.15	5.45
Boston	2.25b	2.00b	1.80b	1.20	1.20	.80	1.20	1.20	....	....	7.00m
Chicago	2.45	2.20	2.05	1.20‡	1.20‡	1.20‡	1.35‡	1.35‡	1.00‡	1.00‡	....
Cincinnati	2.56	2.31	2.05	1.20	1.20	1.30	1.80	1.80	....	....	6.60
Cleveland	2.30	2.05	....	1.40	1.40	1.30	1.60	1.60	1.65	1.65	7.15i
Dallas	2.30	2.05	1.85	1.40	1.40	1.05	1.00	1.15	1.84	1.89	7.00
Denver	3.08	2.85	....	1.20	1.40	.90	....	....	....	....	....
Detroit	2.15	1.90	1.65	1.15	1.25	.95	1.50	1.60	1.15‡	1.25‡	6.50
Kansas City	2.55	2.30	2.06	1.85	2.30	1.15	1.85	1.80	....	....	7.90n
Los Angeles	2.32	2.12	....	2.00	2.00	1.70	2.00f	2.00f	....	....	7.60
Minneapolis	2.86	....	2.41	1.00h	1.00h	.25h	1.00h	1.00h	....	....	7.15j
Montreal	....	....	1.70c	.85	.95	1.15‡	1.25‡	1.30‡	....	....	6.50l
New Orleans	2.37	2.12	....	1.50	1.50	1.25	....	....	....	....	8.00
New York	2.45‡	2.20‡	....	1.50de	1.50de	1.00de	1.65de	1.75de	....	....	7.70
Philadelphia	2.55	2.30	2.10	1.55‡	1.65‡	1.35‡	2.00‡	2.05‡	1.00	1.00	8.25k
Pittsburgh	2.40	2.15	1.95	1.80‡	1.80‡	2.10‡	2.25‡	2.25‡	1.50	1.50	8.75
St. Louis	2.52	2.27	....	1.50‡	1.50‡	1.50‡	.85h	.85h	.85g	.75g	7.50
San Francisco	2.72	2.52	2.20	1.35	1.35	1.35	1.50	1.50	....	....	7.50
Seattle	3.10	2.85	....	1.17o	1.17o	1.17o	1.33o	1.33o	....	....	7.30o

‡Delivered. *a* 10c. allowed for each returnable bag. *b* 10c. per bbl. off for cash. *c* Sales tax included. *d* Per cu. yd. *e* Barge lots alongside docks. *f* Crushed granite. *g* F.o.b. Granite City, Ill. *h* F.o.b. plant. *i* Within three miles of Public Square. *j* 5% discount for cash. *k* Discount 35c. 500 to 2000; 70c. 2000 to 5000; 95c. over 5000. *l* Up to 200 cu. yd. *m* 50c. off for cash. *n* 25 c.y. or more *o* 2% off for cash.

CASH DISCOUNTS, CEMENT to Contractors: truck delivery, 2% for cash on 10th of month; on carload deliveries, no trucking, same as dealer cash discount 10c. per bbl. for payment within 15 days of date of invoice, in Montreal 5% if payment before 15th.

CURRENT MAXIMUM PRICES RECEIVED AT CEMENT MILL

Charge for bags not included. For cloth bags, add 40c. per bbl.; 10c. refund allowed for each returnable bag; for paper bags add 15c. per bbl., not refundable.

	Bagged	Bulk		Bagged	Bulk		Bagged	Bulk
Buffington, Ind.	$1.70	$1.65	Ironton, Ohio	$1.60	$1.55	Northampton, Pa.	$1.65	$1.60
Crestmore, Calif.	1.72	....	Iola, Kans.	1.70	1.65	North Birmingham, Ala.	1.75	1.70
Dallas, Tex. (Inc. 5c. tax)	1.80	1.75	La Salle, Ill.	1.70	1.65	Richard City, Tenn.	1.85	1.80
Hannibal, Mo.	1.70	1.65	Limedale, Ind.	1.70	1.65	Steelton, Minn.	1.80	1.75
Hudson, N. Y.	1.75	1.70	Mason City, Ia.	1.70	1.65	Universal, Pa.	1.65	1.60
Independence, Kans.	1.70	1.65	Norfolk, Va.	1.70	1.65	Waco, Tex. (Plus 5c. Tax in Texas)	1.75	1.70

LOWER PENINSULA, MICHIGAN. Uniform carload lot cement price established March, 1937.

PAVING BRICK, BLOCKS, ASPHALT, ROAD OILS—F.O.B. CITY

	PAVING BRICKS AND BLOCKS			PAVING ASPHALT Per ton, less than 80 penetration,		ASPHALT BINDERS—FLUXES Per gal., 80–300 penetration,		CUTBACK ASPHALT Per ton,		ROAD OILS Per gal.,	ASPHALT EMULSION Per gal.	
	Granite per M, lots of 50,000, 4x4x8 in.	Brick per M, 3x4x8½ in., carload lots	Wood per sq. yd., 3½ in. 16-lb. treat	Tank car	Drums	Tank car	Drums	Tank car	Drums	Tank car	Tank car	Drums
Atlanta	$75.00	$38.85	$2.25	$18.20e	$23.41e	$0.0728e	$0.1049e	$.0768he	$.1089he	$0.0668e	$0.0834	$0.0834
Baltimore	140.00	44.00‡	2.50	15.00	20.00	.06	.085‡	.07h	.10h	......	......	......
Birmingham	......	25.00	......	19.80	24.80	.0804	.1054	.082h	.112h	......	...	......
Boston	70.00	46.50	3.00	17.00‡	22.00‡	.07‡	.095‡	.09h‡	.12h‡	.075‡	.095‡	.125‡
Chicago	140.00	48.00	2.30	18.00	23.00	17.00g	22.00g	.07h	.11h	.05	.09	.135
Cincinnati	112.00	37.50	......	13.47	17.47	.12	......	17.00	......	.051	.078	......
Cleveland	3.75a‡	37.00	2.85	18.00	22.25	.081	.099	.091h	.101h	.06	.095	.10
Dallas	......	32.50	......	15.80	20.00	.05	.08	14.80	23.00	.05	.075	.105
Denver	......	27.50	......	......	......	......	......	......	......	......	......	......
Detroit	......	35.00	......	16.72f	21.97f	......	20.60g	15.60	20.60	.0535	.1125	.1525
Kansas City	......	44.00	......	18.50	23.50	.077	.1075	.077h	.107h	.057	.11	.15
Los Angeles	......	50.00	......	11.00	15.16	11.00g	15.16g	11.00	......	.042	.06	.12
Minneapolis	......	.....	1.90d	21.70	26.70	.098	.137	21.85	34.65	.0638	......	......
Montreal	90.00c	60.00	3.42	14.00	20.00	.10	.13	.0975h	.01125h	.0675	.135	.165
New Orleans	......	.....	......	14.00	17.00	.065	.09	.07h	.10h	......	.078	......
New York	......	67.00	2.85	15.10	20.50	.06	.085	.07h	.10h	......	.075	.11
Philadelphia	120.00	.....	......	15.00	20.00	.06	.085	.065h	.095h	.055	.07	.10
Pittsburgh	115.00	40.00	......	19.00	24.00	.077	.1125	.068h	.121h	.0675	......	......
St. Louis	115/130	37.00	.....	19.00	24.00	.0775	.1075	.08h	.11h	.045	.09	.12
San Francisco	......	70.00	......	12.00	18.00	12.00g	18.00g	12.50	23.00	.04	.0575	.117
Seattle	......	60.00i	......	5.55	25.55	19.50g	25.55g	15.50/16.50	28.50	8.15g	.075	.1325

‡Delivered. *a* 4½x6x5½ in. per sq. yd. delivered. *b* 4x5x9 in. aver. *c* Sales tax included. *d* 2½ in. 6 to 8-lb. treatment. *e* Local reduction due to 20% reduction intra-state class freight rates, only Georgia affected. *f* Mexican. *g* Per ton. *h* Per gallon. *i* 3½x4x8½ in.

MATERIALS PRICES—JUNE, 1938

Market quotations on construction materials and wage rates reported monthly by ENR correspondents

LOWER lumber prices are the principal price change for the third successive month. Southern Pine is down $1.00 to $3.00 in Chicago; down $1.50 to $4.50 in Dallas; down 50c. to $2.00 on 1- and 2-in. sizes in St. Louis, except on 2 x 10-in. which is up 50c. Western Pine is off $5.00 per M ft. in Minneapolis on 1-in. sizes, and Native Pine is $2.00 to $3.00 lower in Denver. Douglas Fir is $8.00 to $10.00 lower in Minneapolis, and $2.00 lower on 2 x 8-in. size in Chicago. Fir timbers are off $1.00 in Chicago and St. Louis, and $5.00 in Minneapolis. Native Pine timber is $1.00 lower on 6 x 12-in. size in Denver. Fir plywood base price at Seattle is up to $70.13 on the ⅝-in. size and $80.03 on the ¾-in. size.

Portland cement is 5c. per bbl. lower in Minneapolis. Gravel and crushed stone is 32c. lower in Los Angeles, while gravel is up 10c. per cu. yd. in New York. Sand is up 6c. in Kansas City, 5 to 10c. in New York, and off 2c. in Los Angeles. Ready-mixed concrete is off 71c. per cu. yd. in Los Angeles.

Common labor on buildings is up 8½c. in New York from the former 95c. per hr. rate. Philadelphia common labor rates, formerly 40 to 50c. per hr., closed the span and the 50c. rate now prevails. Bricklayers, carpenters, structural ironworkers and plasterers rates are 25c. per hr. higher in Dallas than when last reported. Carpenters in Philadelphia receive $1.75 per hr., an increase of 25c. from their former rate.

CEMENT, AGGREGATES, READY-MIXED CONCRETE—F.O.B. CITY

	PORTLAND CEMENT Per bbl., carload lots, including 40c per bbl. for bags, cash discount not included			SAND AND GRAVEL Per ton, carload lots			CRUSHED STONE Per ton, carload lots		CRUSHED SLAG Per ton, carload lots, f.o.b. plant		CONCRETE Ready Mixed 1:2:4, 50 c.y. or more, delivered
	Cloth Bags a	Paper Bags	Bulk	Gravel, 1½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	
Atlanta	$2.93	$2.68	$2.60	$1.75	$1.85	$1.95	$1.65	$1.75	$1.55	$1.65	$7.75
Baltimore	2.35	2.10	1.90	1.80‡	1.80‡	1.30‡	1.80‡	1.80‡	1.75‡	1.75‡	7.25
Birmingham	2.55	2.30	1.99	1.80	1.80	1.45	1.00	1.00	.90	1.15	5.45
Boston	2.29b	2.04b	1.84b	1.20	1.20	.85	1.20	1.20	....	....	6.50m
Chicago	2.60	2.35	2.20	2.00‡d	2.00‡d	2.00‡d	2.00‡d	2.00‡d	1.25‡	1.25‡	....
Cincinnati	2.56	2.31	2.05	1.20	1.20	1.30	1.80	1.80	....	....	6.60
Cleveland	2.34	2.09	....	1.60i	1.60i	1.50i	1.65i	1.65i	1.65i	1.65i	6.65i
Dallas	2.30	2.05	1.85	1.60p	1.60p	1.35p	1.69p	1.84p	....	....	6.50
Denver	3.02	2.77	....	1.20	1.40	.90	....	....	....	....	7.25
Detroit	2.03	1.78	1.58	1.05	1.15	.85	1.40	1.45	1.15‡	1.25‡	6.50
Kansas City	2.59	2.34	2.10	1.85	2.30	1.21	1.85	1.80	....	....	7.90n
Los Angeles	2.32	2.12	....	1.68	1.68	1.68	1.68f	1.68f	....	....	6.89
Minneapolis	2.90	2.65	....	1.00h	1.00h	.25h	1.00h	1.00h	....	....	7.15j
Montreal	....	....	1.70c	.95	.85	1.20‡	1.15‡	1.25‡	....	....	7.00
New Orleans	2.41	2.16	2.01	1.50	1.50	1.25	....	....	....	....	7.25
New York	2.45‡	2.20‡	....	1.35de	1.35de	.80/.85	1.65de	1.75de	....	....	7.70
Philadelphia	2.59	2.34	2.14	1.55‡	1.65‡	1.35‡	2.00‡	2.05‡	1.00	1.00	8.25k
Pittsburgh	2.44	2.19	1.99	1.80‡	1.80‡	2.10‡	2.25‡	2.25‡	1.50	1.50	8.75
St. Louis	2.55	2.30	....	1.50‡	1.50‡	1.25/1.50‡	.85h	.85h	.75g	.75g	7.50
San Francisco	2.72	2.52	2.20	1.35	1.35	1.35	1.50	1.50	....	....	7.50
Seattle	3.10o	2.85o	....	1.17o	1.17o	1.17o	1.33o	1.33o	....	....	7.30o

‡Delivered. *a* 10c. allowed for each returnable bag. *b* 10c. per bbl. off for cash. *c* Sales tax included. *d* Per cu. yd. *e* Barge lots alongside docks. Crushed granite. *g* F.o.b. Granite City, Ill. *h* F.o.b. plant. *i* Within three miles of Public Square. *j* 5% discount for cash. *k* Discount 35c. 500 to 2000; 70c. 2000 to 5000; 95c. over 5000. *l* Up to 200 cu. yd. *m* 50c. off for cash. *n* 25 c.y. or more. *o* 2% off for cash. *p* 10c per ton off, cash 15 days

CASH DISCOUNTS, CEMENT to Contractors: truck delivery, 2% for cash on 10th of month; on carload deliveries, no trucking, same as dealer cash discount 10c. per bbl. for payment within 15 days of date of invoice, in Montreal 5% if payment before 15th

CURRENT MAXIMUM PRICES RECEIVED AT CEMENT MILL

Charge for bags not included. For cloth bags, add 40c. per bbl.; 10c. refund allowed for each returnable bag; for paper bags add 15c. per bbl., not refundable.

	Bagged	Bulk		Bagged	Bulk		Bagged	Bulk
Buffington, Ind.	$1.70	$1.65	Ironton, Ohio	$1.60	$1.55	Northampton, Pa.	$1.65	$1.60
Crestmore, Calif.	1.72	....	Iola, Kans.	1.70	1.65	North Birmingham, Ala	1.75	1.70
Dallas, Tex. (Inc. 5c. tax)	1.80	1.75	La Salle, Ill.	1.70	1.65	Richard City, Tenn	1.85	1.80
Hannibal, Mo	1.70	1.65	Limedale, Ind.	1.70	1.65	Steelton, Minn	1.80	1.75
Hudson, N. Y	1.75	1.70	Mason City, Ia.	1.70	1.65	Universal, Pa	1.65	1.60
Independence, Kans	1.70	1.65	Norfolk, Va.	1.70	1.65	Waco, Tex. (Plus 5c. Tax in Texas)	1.75	1.70

LOWER PENINSULA, MICHIGAN. Uniform carload lot cement price established March, 1937.

PAVING BRICK, BLOCKS, ASPHALT, ROAD OILS—F.O.B. CITY

	PAVING BRICKS AND BLOCKS			PAVING ASPHALT Per ton, less than 80 penetration,		ASPHALT BINDERS—FLUXES Per gal., 80–300 penetration,		CUTBACK ASPHALT Per ton,		ROAD OILS Per gal.,	ASPHALT EMULSION Per gal.,	
	Granite per M, lots of 50,000, 4x4x8 in.	Brick per M, 3x4x8½ in., carload lots	Wood per sq. yd., 3½ in. 16-lb. treat	Tank car	Drums	Tank car	Drums	Tank car	Drums	Tank car	Tank car	Drums
Atlanta	$75.00	$39.35	$2.25	$17.20e	$22.41e	$0.0678e	$0.0999e	$.0718he	$.1039he	$0.0618e	$0.0834	$0.0834
Baltimore	140.00	44.00‡	2.75	15.00	20.00	.06	.085	.07h	.10h	......	......	......
Birmingham	......	25.00	......	18.20	23.20	.0747	.0997	.0834h	.1134h	......	...	......
Boston	70.00	46.50	3.00	15.00	20.00	.06	.085	.07h	.10h	.07‡	.09‡	.12‡
Chicago	140.00	50.00	2.40	15.00	20.00	14.00g	19.00g	.07h	.11h	.04	.08	.12
Cincinnati	112.00	37.50	......	13.47	17.47	.12	......	17.00	......	.051	.078	......
Cleveland	110.00	37.50	2.85	17.44	21.44	.075	.09	.08h	.09h	.05	.09	.095
Dallas	......	30.50	......	12.00	17.00	.04	.07	13.00	18.00	.035	.05/.07	.07/.09
Denver	......	27.50	......	......	......	......	......	......	......	......	......	......
Detroit	......	35.00	......	16.72f	21.97f	15.60	19.11g	14.10	20.60	.0535	.0661	.0995
Kansas City	......	44.00	......	18.50	23.50	.077	.1075	.077h	.107h	.057	.11	.15
Los Angeles	......	50.00	......	11.00	15.16	11.00g	15.16g	11.00	......	.042	.06	.12
Minneapolis	......	.....	1.90d	21.90	26.90	.10	.14	23.80	33.35	.0645	......	......
Montreal	85.00c	57.00	3.63	14.60	21.25	.105	.135	.101h	.121h	.0935	.135	.165
New Orleans	......	.....	......	14.00a	19.00a	.055	.085	.06h	.09h	.05	......	......
New York	......	68.00	2.85	15.10	20.50	.06	.085	.07h	.10h	....	.075	.11
Philadelphia	120.00	.....	......	14.00	19.00	.055	.08	.06h	.09h	.05	.06	.09
Pittsburgh	115.00	40.00	......	19.00	24.00	.077	.1125	.068h	.121h	.0675	.....	......
St. Louis	110.00/121.00	37.00	....	17.00	22.00	.07	.10	.075h	.105h	.04	.075	.105
San Francisco	......	70.00	......	12.00	18.00	12.00g	18.00g	12.50	23.00	.04	.0475	.117
Seattle	......	60.00i	......	22.50	27.55	20.50g	25.55g	15.70/16.70	29.20/30.20	7.80/8.75	.0575	.1375

‡Delivered. *a* F.o.b. Baton Rouge. *b* 4x5x9 in. aver. *c* Sales tax included. *d* 2½ in. 6 to 8-lb. treatment. *e* Local reduction due to 20% reduction intra-state class freight rates, only Georgia affected. *f* Mexican *g* Per ton. *h* Per gallon. *i* 3½x4x8½ in.

IRON AND STEEL PRODUCTS—BASE MILL PRICES

	STRUCT. SHAPES-PLATE	REINF. BARS ¾-in. billet *b*	RIVETS ½-in. structural	WIRE NAILS Base	SHEET PILING Base	STEEL RAILS Per Gross Ton Standard	STEEL RAILS Per Gross Ton Light	STEEL RAILS Per Gross Ton Re-rolled	TRACK SUPPLIES Angle bars	TRACK SUPPLIES Std. spikes *c*	TRACK SUPPLIES Tie plates *c*	TRACK SUPPLIES Track bolts
Birmingham	$2.40	$2.60	$3.70	$2.55	....	$42.50	$43.00	$42.00	$2.80	$3.15	$2.30	$4.35
Chicago	2.30	2.60	3.70	2.80	$2.70	42.50	43.00	42.00	2.80	3.15	2.30	4.35
Pittsburgh	2.25	2.55	3.60	2.75*d*	2.60	42.50	43.00	42.00	2.80	3.15	2.30	4.35
Buffalo	2.35	2.60	....	....	....	....	....	....	....	....	2.30	....
Cleveland	2.445‡	2.60	....	....	....	....	....	....	....	....	....	....
Youngstown	....	2.60	....	....	....	....	....	....	....	3.15	....	....
Gulf ports	2.65a	2.95a	....	....	3.05a	....	....	....	....	....	....	
Pacific ports	2.80a	2.95a	....	....	3.05a	....	....	....	....	3.15	2.40	....

‡ Delivered. *a* F.o.b. cars dock. *b* For rail steel deduct 15c. from billet prices. *c* Other basing points include Portsmouth, O., Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., and Pacific coast ports, on tie plates alone, Steelton, Pa., on spikes alone, Lebanon, Pa., Richmond, Va. *d* Add switching charge $18 per c.l.

IRON AND STEEL PRODUCTS—F.O.B. WAREHOUSE, PER 100 LB., BASE PRICE

	STRUCTURAL SHAPES Per 100 lb., base price	REINFORCING BARS Per 100 lb., ¾ in., base price 15 tons or over *b* New billet	Rail steel	Add $/cwt. for Switch	Del.	EXPANDED METAL LATH —Per 100 sq.yd., carload lots— Std. diamond mesh, 3.4 lb.	Std. ribbed 3.4 lb.	WELDED FABRIC REINFORCING —Per 100 s.f., carload lots— 4x16 in., No. 5 & 10 wires	4x12 in., No. 8 & 12 wires	6x6 in., No. 6 & 6 wires Per sq. yd.	SHEET PILING Per 100 lb. base price
Atlanta	$3.65	$2.82	$2.67	.02½	.10	$21.00	$23.00	$1.75	$1.31	$0.1692	$2.60
Baltimore	3.70	2.92	2.77	....	.10	23.00	25.00	1.62	1.22	.1566	3.00
Birmingham	2.40*a*	2.60	2.45	.02½	.10	22.50	24.50	....	....	.....	....
Boston	4.07	3.03	2.88	$20 C.L.	.10	21.60‡	23.60‡	1.68	1.26	.1620	3.02
Chicago	2.30*a*	2.60	2.45	.03	.05	23.00	25.00	1.61	1.22	.1557	2.70
Cincinnati	3.95	2.815*c*	2.665*c*	....	.05	21.50	23.50	1.60	1.21	.1548	....
Cleveland	3.86	2.60	2.45	.02½	.10	22.50	22.50	1.59	1.20	.153	....
Dallas	2.45	3.335	3.185	....	....	.....	.....	1.86	1.38	.1791	2.85
Denver	4.48	4.00	3.85	....	....	23.50	25.50	1.87	1.38	.1809	....
Detroit	3.96‡	2.71	2.56	....	.10	22.50	24.50	1.62	1.22	.1566	2.875
Kansas City	4.24	3.02*c*	2.87*c*	.0	.05	20.50	22.50	1.82	1.29	.1665	3.13
Los Angeles	3.825	2.95	2.80	.02½	.05	23.00	27.50	1.89	1.40	.1827	3.72
Minneapolis	4.00‡	2.90*c*	2.75*c*	.0	.10	26.00	30.00	1.71	1.28	.1656	3.00*d*
Montreal	2.90	2.40	2.40	....	....	33.00	34.00	2.50	1.82	.253	3.50
New Orleans	....	2.94	2.79	.05	.10	21.00	23.00	1.76	1.31	.1701	....
New York	3.97	2.88	2.73	....	.10	21.50	23.00	1.67	1.26	.1584	2.93
Philadelphia	3.90	2.84	2.69	....	....	22.50	24.50	1.63	1.23	.1575	2.89
Pittsburgh	2.25*a*	2.55	2.40	.02½	.10	20.50	23.50	1.55	1.18	.1494	2.60
St. Louis	3.99	2.87	2.72	.0	.05	22.00/24.00	24.00/26.00	1.62	1.21	.1566	2.70
San Francisco	3.95	2.95	2.80	.02½	.10	25.50	27.50	1.89	1.39	.1827	3.50
Seattle	3.10	2.95	....	....	....	25.50	27.50	1.89	1.39	.1827	3.05

‡ Delivered. *a* Mill prices. *b* 5-15 tons, add 15c. 1-5 tons, add 25c. Less than 1 ton, add 50c. *c* 20 tons or over Base. *d* Mill price plus freight.

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C. I. PIPE Per net ton f.o.b. 6 in. to 24 in.*a*	VITRIFIED SEWER PIPE Per foot, delivered, 8 in., s.s.	12 in., s.s.	ASTM 24 in., d.s.	C13–35 36 in., d.s.	CLAY DRAIN TILE Per 1,000 ft., carload lots, f.o.b. 6 in.	8 in.	CONCRETE SEWER PIPE Per ft., delivered: ASTM C 14–35 12 in.	24 in.	WROUGHT STEEL PIPE Full standard weight. *h* 1 to 3 in., Butt Weld Black %	Galv. %	3½ to 6 in., Lap Weld Black %	Galv. %
Atlanta	$50.00	$0.26*bc*	$0.468*bc*	$1.69	$4.50*c*	$85.00	$128.00	$0.45	$1.625	44.5	35.5	42	32.6
Baltimore	53.50	.30	.55	2.40	6.90	110.00	170.00	.40	1.60	....	....	....	....
Birmingham	46.00	.25	.45	1.625	4.66	85.00	220.00	.40	1.60	64.5	55.5	62	52.5
Boston	53.50	.224	.432	1.98	5.8425	99.00	153.00	.45	2.50	....	....	....	....
Chicago	54.50	.28	.54	2.25	6.25	100.00‡	150.00‡	.38	1.48	52.5	41.25	50.625	37.5
Cincinnati	53.00	.203	.3915	1.665	5.0225	75.00	120.00	.60	1.90	52.6875	41.4375	49.5625	37.6875
Cleveland	54.50	.154	.297	1.26	3.9975	69.00	108.00	.36	1.80	56	44.5	51.5	40.5
Dallas	58.00	.40	....	....	....	160.00	260.00	.46	1.57	69.5	61.5	67	58.5
Denver	66.00	.29†	.50†	2.10†	....	130.00	220.00	....	....	44	33	41	29
Detroit	52.60	.203	.3915	1.71	5.2375	76.50	130.00	.33	1.50	53.2	41.9	50.1	37.8
Kansas City	56.00	.30	.54	2.16	5.00	120.00	240.00	.45	1.60	48.8	37.5	45.6	33.8
Los Angeles	54.50	.282†	.508†	2.034†	5.085†	115.50	192.50	1.00	2.00	57.1	48.1	54.6	44.6
Minneapolis	57.00	.24†	.432†	1.728†	4.60†	......	......	.65	1.75	....	....	....	....
Montreal	55.00	.33†*e*	.59†*e*	2.04†*e*	....	82.00	134.00	.51	2.04	....	....	....	....
New Orleans	50.80	.26	.468	1.69	....	150.00	220.00	.45	1.65	....	....	....	....
New York	53.00	.27	.55	2.25	5.84	......	......	.50	1.50	52.49*i*	41.53*i*	48.20*i*	37.80*i*
Philadelphia	50.00	.224	.45	2.25	6.00	150.00	180.00	.54	1.80	64.5*i*	55.5*i*	62.*i*	52.5*i*
Pittsburgh	56.00	.182†	.351†	1.62†	4.92†	97.80	154.20	.85*g*	2.00*g*	64.5*j*	55.5*j*	62*j*	52.5*j*
St. Louis	53.00	.28	.504	2.016	3.96	85.00	170.00	.75	1.80	51.125	39.875	48	36.125
San Francisco	55.00	.315*d*	.567*d*	2.268	5.67	103.50	172.50	.45	2.50	53	44	42.75	33.33
Seattle	55.50	.294	.441	2.142	5.355	68.00	160.00	.60*f*	1.60*f*	37	27	37	24

‡ Delivered. † F.o.b. *a* B. & S. class B and heavier, C/L lots, 200 tons and over Burlington, N. J. (base) $50.00. Gas pipe and class A, $3 per ton additional, 4 in., $3 per ton additional, 30 in. and larger usually $2 per ton less. *b* Double strength. *c* List to dealer. *d* List. *e* Sales and municipal taxes extra. *f* Less 5% for cash. *g* Culvert pipe. *h* Discounts from standard list for delivery from warehouse, except Pittsburgh prices are f.o.b. mill. Base price $200 per net ton. List prices per ft.: ½ in., 8½c.; ¾ in., 11½c.; 1 in., 17c.; 2 in., 37c.; 2½ in., 58½c.; 3 in., 76½c.; 4 in., $1.09; 6 in., $1.92. *i* Resale price to consumer, car load lots shipped from mill. *j* Applies also at Lorain, Ohio, mills. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, O., Chicago Dist. Billing is from point producing lowest price at destination. WROUGHT IRON PIPE: Base price and list prices per ft. same as wrought steel pipe. Discount for Pittsburgh base: Buttweld — 1 in. and 1¼ in. black 30, galv. 14; 1½ in. black 34, galv. 16½; 2 in. black 33½, galv. 16. Lapweld — 2½ in. to 3½ in. black 27½, galv. 12½; 4½ in. to 8 in black, 28½ galv. 15.

IRON AND STEEL PRODUCTS—BASE MILL PRICES

	STRUCT. SHAPES-PLATE	REINF. BARS ¾-in. billet b	RIVETS ¾-in. structural	WIRE NAILS Base	SHEET PILING Base	STEEL RAILS Per Gross Ton Standard	Light	Re-rolled	TRACK SUPPLIES Angle bars	Std. spikes c	Tie plates c	Track bolts
Birmingham	$2.40	$2.50	$3.70	$2.55	....	$42.50	$43.00	$42.00	$2.80	$3.15	$2.30	$4.35
Chicago	2.30	2.50	3.70	2.80	$2.70	42.50	43.00	42.00	2.80	3.15	2.30	4.35
Pittsburgh	2.25	2.45	3.60	2.75d	2.60	42.50	43.00	42.00	2.80	3.15	2.30	4.35
Buffalo	2.35	2.50	....	....	2.70	....	....	....	....	....	2.30	....
Cleveland	2.45‡	2.50	3.60	....	....	....	....	....	....	....	....	....
Youngstown	....	2.50	....	....	....	....	....	....	....	3.15	....	....
Gulf ports	2.65a	2.85a	....	....	3.05a	....	....	....	....	....	....	....
Pacific ports	2.80a	2.95a	....	....	3.05a	....	....	....	....	3.15	2.40	....

‡ Delivered. *a* F.o.b. cars dock. *b* For rail steel deduct 15c. from billet prices. *c* Other basing points include Portsmouth, O., Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., and Pacific coast ports, on tie plates alone, Steelton, Pa., on spikes alone, Lebanon, Pa., Richmond, Va. *d* Add switching charge $18 per c.l.

IRON AND STEEL PRODUCTS—F.O.B. WAREHOUSE, PER 100 LB., BASE PRICE

	STRUCTURAL SHAPES Per 100 lb., base price	REINFORCING BARS Per 100 lb., ¾ in., base price 15 tons or over b New billet	Rail steel	Add $/cwt. for Switch	Del.	EXPANDED METAL LATH Per 100 sq.yd., carload lots Std. diamond mesh, 3.4 lb.	Std. ribbed 3.4 lb.	WELDED FABRIC REINFORCING Per 100 s.f., carload lots 4x16 in., No. 5 & 10 wires	4x12 in., No. 8 & 12 wires	6x6 in., No. 6 & 6 wires Per sq. yd.	SHEET PILING Per 100 lb base price
Atlanta	$3.65	$2.74	$2.59	.02½	.10	$21.00	$23.00	$1.75	$1.31	$0.1692	$2.60
Baltimore	3.90	2.95	2.80	....	.10	25.00	28.00	1.62	1.22	.1566	3.00
Birmingham	2.40a	2.50	2.35	.02½	.10	22.50	24.50	....	....	.....	....
Boston	4.12	3.13	2.98	$20 C.L	.10	22.00‡	24.00‡	1.68	1.26	.1620	3.12
Chicago	2.30a	2.50	2.35	.03	.05	23.00	25.00	1.61	1.22	.1557	2.70
Cincinnati	3.95	2.815c	2.665c	....	.05	21.50	23.50	1.60	1.21	.1548	....
Cleveland	3.86	2.50	2.35	.02½	.10	21.50	23.50	1.59	1.20	.153	....
Dallas	4.15	2.80	2.65	....	....	26.50	28.50	1.86	1.38	.1791	....
Denver	4.56	4.14	3.99	....	....	23.50	25.50	1.87	1.38	.1809	....
Detroit	3.96‡	2.71	2.56	....	.10	22.50	24.50	1.62	1.22	.1566	2.875
Kansas City	4.29	2.96c	2.81c	.0	.05	20.50	22.50	1.82	1.29	.1655	3.16
Los Angeles	3.825	2.95	2.80	.02½	.05	23.00	27.50	1.89	1.40	.1827	3.72
Minneapolis	4.00‡	2.81c	2.66c	.0	.10	26.00	30.00	1.71	1.28	.1656	3.03d
Montreal	3.80	2.80	2.70	....	....	29.00	32.50	2.48	1.84	.261	3.95
New Orleans	4.10	3.04	2.89	.05	.10	21.00	23.75	1.76	1.31	.1701	3.05
New York	3.99	2.81	2.66	....	.05	21.50	23.00	1.67	1.26	.1584	2.96
Philadelphia	3.92	2.88	2.73	....	....	22.50	24.50	1.63	1.23	.1575	2.89
Pittsburgh	2.25a	2.45	2.30	.02½	.10	21.50	24.50	1.55	1.18	.1494	2.60
St. Louis	4.02	2.54	2.39	.0	.05	23.00/24.00	25.00/26.00	1.62	1.21	.1566	2.70
San Francisco	3.95	2.95	2.80	.02½	.10	25.50	27.50	1.89	1.39	.1827	3.50
Seattle	2.80e	2.95e	....	....	....	25.50	27.50	1.89	1.39	.1827	3.05

‡ Delivered. *a* Mill prices. *b* 5–15 tons, add 15c. 1–5 tons, add 25c. Less than 1 ton, add 50c. *c* 20 tons or over Base. *d* Mill price plus freight. *e* F.o.b. dock.

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C. I. PIPE Per net ton f.o.b. 6 in. to 24 in. a	VITRIFIED SEWER PIPE Per foot, delivered, 8 in., s.s.	12 in., s.s.	ASTM C13–35 24 in. d.s.	36 in. d.s.	CLAY DRAIN TILE Per 1,000 ft., carload lots, f.o.b. 6 in.	8 in.	CONCRETE SEWER PIPE Per ft., delivered: ASTM C 14–35 12 in.	24 in.	WROUGHT STEEL PIPE Full standard weight. h 1 to 3 in., Butt Weld Black %	Galv. %	3½ to 6 in., Lap Weld Black %	Galv. %
Atlanta	$50.40	$0.26bc	$0.468bc	$1.69	$4.50c	$85.00	$128.00	$0.45	$1.625	58.7	49.7	56.2	46.7
Baltimore	53.80	.30	.52	2.40	6.25	110.00	170.00	.50	1.75	61.7	52.7	59.2	49.7
Birmingham	46.00	.25	.45	1.625	4.66	85.00	220.00	.40	1.60	58.7	49.7	56.2	46.7
Boston	56.00	.28	.54	2.475	6.67	136.00‡	196.50‡	.50	2.50	60.4	51.4	57.9	48.4
Chicago	54.80	.28	.54	2.25	6.25	100.00‡	150.00‡	.38	1.48	62.0	53.0	59.5	50.0
Cincinnati	53.70	.203	.3915	1.665	5.0225	75.00	120.00	.60	1.90	62.05	53.05	59.55	50.05
Cleveland	55.24	.175	.3375	1.35	3.9975	69.00	108.00	.26	1.70	63.8	54.8	61.3	51.8
Dallas	59.20	.265	.477	1.90	4.70	......	......	.46	1.57	56.0	47.0	53.5	44.0
Denver	61.60	.29†	.50†	2.10†	....	190.00	220.00	....	....	55.0	46.0	52.5	43.0
Detroit	55.24	.147	.2835	1.215	4.70	76.50	130.00	.25	1.125	62.4	53.4	59.9	50.4
Kansas City	56.12	.30	.54	2.16	5.00	120.00	240.00	.45	1.60	59.0	50.0	56.5	47.0
Los Angeles	56.00	.282†	.508†	2.034†	5.085†	115.50	192.50	1.00	2.00	56.8	47.8	54.3	44.8
Minneapolis	58.10	.24†	.432†	1.728†	4.60†	......	......	.70	1.80	59.4	50.4	56.9	47.4
Montreal	60.00	.55e	.90e	3.15e	....	......	......	1.50	6.00	....	....	....	....
New Orleans	52.38	.26	.486	1.69	....	85.00	......	.37	2.10	59.1	50.1	56.6	47.1
New York	53.20	.27	.55	2.15	5.84	......	......	.55	1.70	61.1	52.1	58.6	49.1
Philadelphia	51.90	.21	.405	1.71	4.85	100.00	150.00	.54	1.80	61.5	52.5	59.0	49.5
Pittsburgh	56.60	.168†	.324†	1.53†	4.4075†	97.80	154.20	.85g	2.00g	64.5i	55.5i	62.0i	52.5i
St. Louis	53.48	.28	.504	2.016	3.96	85.00	170.00	.80	1.80	60.8	51.8	58.3	48.8
San Francisco	56.00	.315d	.567d	2.268	5.67	103.50	172.50	.45	2.50	56.85	47.85	54.35	44.85
Seattle	56.35	.294	.441	2.142	5.355	68.00	160.00f	.60f	1.60f	56.85	47.85	54.35	44.85

‡ Delivered. † F.o.b. † B. & S. class B and heavier, C/L lots, 200 tons and over Burlington, N. J. (base) $50.00. Gas pipe and class A, $3 per ton additional, 4 in., $3 per ton additional, 30 in. and larger usually $2 per ton less. *b* Double strength. *c* List to dealer. ¾ List. *e* Sales and municipal taxes extra. *f* Less 5% for cash. *g* Culvert pipe. *h* Discounts from standard list consumers carload prices, except Pittsburgh prices are f.o.b. mill. Base price $200 per net ton. List prices per ft.: ½ in., 8½c.; ¾ in., 11½c.; 1 in., 17c.; 2 in., 37c.; 2½ in., 58½c.; 3 in., 76½c.; 4 in., $1.09; 6 in., $1.92.

i Applies also at Lorain, Ohio, mills. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, O., Chicago Dist. Billing is from point producing lowest price at destination. WROUGHT IRON PIPE: Base price and list prices per ft. same as wrought steel pipe. Discount for Pittsburgh base: Butt-weld — 1 in. and 1¼ in. black 30, galv. 14; 1½ in. black 34, galv. 16½; 2 in. black 33½, galv. 16. Lapweld — 2½ in. to 3½ in. black 27½, gavl. 12½; 4½ in. to 8 in. black, 28½ galv. 15.

LUMBER, TIMBER, PLYWOOD—PER M FT. B.M., CARLOAD LOTS F.O.B.

	SHORT LEAF YELLOW PINE AND DOUGLAS FIR									LONG LEAF Y. P.		PLYWOOD	
	All S. L. Y. P. is No. 2 common or better and for No. 1 N. C. Box. (Prices in Bold Face) *All Fir planks No. 2 common; Fir timber is No. 1 common. Lengths up to 20 ft. (Prices in italics)*									Merchantable grade up to 20 ft.		Rail freight increment (See note for base price)	
	1x6, S4S	1x8, S4S	2x4, S4S	2x6, S4S	2x8, S4S	2x10, S4S	3x12, Rgh	6x12, Rgh	12x12, Rgh	2x12, Rgh	12x12, Rgh	5/8"	3/4"
Atlanta	**$15.50**	**$15.50**	**$15.00**	**$15.00**	**$15.50**	**$16.50**	**$22.00**	.....	.....	$39.00	$50.00	$16.80	$20.50
Baltimore	**30.00**	**30.00**	**33.00**	**33.00**	**33.00**	**35.00**	**45.00**	.....	.....	68.00	68.00	16.45*f*	20.05
	36.00	*36.00*	*37.00*	*35.00*	*35.00*	*35.00*	*40.00*	*$40.00*	*$38.00*	.....	.....	.....	.....
Birmingham	**19.00**	**19.00**	**19.00**	**19.00**	**19.00**	**22.00**	**30.00**	**30.00**	**30.00**	.....	.....	15.55	18.95
[1]	23.00	23.00	26.00	26.00	26.00	31.00	54.00	.....	.....	48.00	53.00	.....	.....
Boston	31.00[2]	31.00[2]	35.00[3]	37.00[3]	50.00[1]	60.00[1]	70.00[1]	.....	.....	70.00	70.00	16.45*f*	20.05
	31.00	*31.00*	*35.00*	*37.00*	*37.00*	*37.00*	*45.00*	*45.00*	*45.00*	.....	.....	.....	.....
Chicago	**28.50**	**28.50**	**30.00**	**30.00**	**30.00**	**38.00**	**40.00**	.....	.....	75.00	75.00	12.45	15.15
	35.00	*35.00*	*39.00*	*39.00*	*39.00*	*44.00*		*42.00*	*42.00*				
Cincinnati	**29.50**	**30.50**	**29.50**	**29.50**	**30.50**	**31.50**	**44.50**	.....	.....	52.50	38.50	15.55	18.95
	.....	.....	.....	.....	.....	.....	*48.50*	*48.50*	*48.50*	.....	.....	.....	.....
Cleveland	**30.00**	**31.00**	**37.00**	**30.00**	**39.00**	**40.00**	**52.00**	*42.00*	*45.00*	52.00	65.00[8]	15.90	19.40
Dallas *e*	**27.50**	**28.50**	**30.00**	**26.50**	**28.50**	**31.50**	**48.00**	**46.00**	**51.50**	62.50	70.00	13.15	16.05
Denver ‡	**46.00**[4]	**46.00**[4]	50.00[4]	49.00[4]	49.00[4]	55.00[4]	54.00[4]	64.00[4]	67.50[4]	.....	.....	9.35	11.35
Detroit	**24.00**	**24.00**	**24.00**	**24.00**	**24.00**	**24.00**	**35.00**	.....	.....	30.00	43.00	15.55	18.95
	.....	.....	.....	.....	.....	.....	*42.00*	*42.00*	*42.00*	.....	.....	.....	.....
Kansas City	**24.00**	**24.00**	**23.00**	**22.00**	**24.00**	**26.00**	**35.00**	.....	.....	55.00	58.00	11.45	13.95
	28.00	*28.00*	*30.00*	*29.00*	*29.00*	*30.00*	*33.00*	*35.00*	*35.00*	.....	.....	.....	.....
Los Angeles *a*	*36.00*	*35.00*	*36.00*	*35.00*	*37.00*	*37.00*	*41.00*	*48.00*	*43.00*	.....	.....	8.90*fg*	10.80*fg*
Minneapolis ‡*b*	54.00[6]	54.00[6]	.....	.....	.....	.....	.....	.....	.....	.....	.....	11.45	13.95
‡	*45.00*	*45.00*	*48.00*	*46.00*	*46.00*	*47.00*	*65.00*	*67.00*	*67.00*	.....	.....	.....	.....
Montreal [7]	*46.00*	*48.00*	*52.00*	50.00	54.00	69.00	84.00	.....	.....	.....	.....	.....	.....
	54.75	*54.75*	*49.25*	*60.75*	*60.75*	*64.25*	*47.00*	.....	.....	.....	.....	.....	.....
New Orleans	**33.00**	**36.00**	**42.50**	**34.00**	**40.00**	**39.00**	**50.00**	.....	.....	54.00	59.00	13.15	16.05
	28.90	*31.50*	*35.90*	*29.50*	*33.00*	*34.00*	*38.00*	.....	.....	.....	.....	.....	.....
New York ‡	**35.00**	**36.00**	**35.00**	**36.50**	**36.50**	**38.00**	**43.00**	.....	.....	80.00	82.50	16.45*f*	20.05*f*
‡	.....	.....	*43.00*	*43.00*	*43.00*	*43.00*	*40.00*	*44.00*	*44.00*	.....	.....	.....	.....
Philadelphia	**22.50**	**24.00**	**23.50**	**24.00**	**25.00**	**26.00**	**28.50**	.....	.....	67.00	67.00	16.45*f*	20.05*f*
	37.00	*37.00*	*32.25*	*36.00*	*37.00*	*37.00*	*37.00*	*43.50*	*43.50*	.....	.....	.....	.....
Pittsburgh	**38.10**	**39.90**	**47.05**	**42.00**	**45.65**	**46.90**	**59.70**	.....	.....	.....	.....	16.20	19.70
	51.90	*49.60*	*49.60*	*49.00*	*48.90*	*49.25*	*66.55*	*66.55*	*66.55*	.....	.....	.....	.....
St. Louis ‡*c*	**28.00**	**29.00**	**28.00**	**27.00**	**28.00**	**29.00**	**47.00**	*54.00*	*54.00*	73.00	72.00	13.15	16.05
San Francisco *d*	*20.00*	*20.00*	*20.00*	*20.00*	*20.00*	*20.00*	*24.00*	*24.00*	*24.00*	.....	.....	6.95*f*	8.50*f*
Seattle	*22.50*	*23.50*	*23.50*	*22.50*	*22.50*	*22.50*	*26.00*	*26.00*	*26.00*	.....	.....	0.00	0.00

Bold Face type, Southern Pine. *Italics, Douglas Fir.* [1] Long leaf. [2] Roofers' N.C. Pine. [3] Spruce. [4] Native. [6] Western Pine, No. 3 Common. [7] Pine. Norway Pine. ‡ Delivered. *a* Yard prices. *b* Contractors in Minneapolis and St. Paul get 10% discount from list. *c* 5M ft. or less. *d* At ship's tackle. *e* 10% discount taken off.

Note: Special concrete form grade Fir Plywood, 4′ by 8′ panels, 5-ply, sanded 2 sides, water resistant glue, car load lots, delivered per 1000 sq. ft. surface. Base price — Seattle: ⅝″, $59.50; ¾″, $67.90. For other centers add rail freight increment from table for proper size. Add: for form oil treatment, $2.50 per M. sq. ft.; for mineral paint sealed edges, $1.00 per M; for resin dipped treatment, $10.00 per M. *f* Lower rate by water shipment. *g* 50,000 lb. minimum.

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS		EXPLOSIVES
	Discounts from latest jobbers list, Sept. 15, 1928 Single or Double Thickness		Per lb. 40% Ammonia Gelatin in 50-lb. cases delivered in 200 lb. lots*
	A quality	B quality	
Atlanta	85%	87%	$0.16
Baltimore	88%	87%	.16
Birmingham	87%	89%	.115
Boston	87%	89%	.16*d*
Chicago	86%	87%	.16
Cincinnati	89–10%	91–10%	.16
Cleveland	85–10%	85–10%	.20
Dallas	80%	80%	.175
Denver	85%	86%	.16*e*
Detroit	87–10%	89–10%	.16
Kansas City	86–10%	87–10%	.165
Los Angeles	90%*a*	90@40%	.1675
Minneapolis	84–10%	85–10%	.165
Montreal	60–30%	70–5%	.18†
New Orleans	88%*b* 85%*c*	86%*b* 80%*c*	.17
New York	89%	90%	.23*f*
Philadelphia	88%	89%	.16
Pittsburgh	86%	87%	.1525
St. Louis	86%	87%	.165
San Francisco	78%	83%	.165
Seattle	83%	86%	.1675

Price of 60% Ammonia Gelatin is $0.015 per lb. higher than 40%

a Disc. from list Aug. 1, 1929. *b* Single thickness. *c* Double.

*Urban prices influenced by service charges or local storage and delivery regulations, do not consistently reflect quantity prices in less congested areas. *d* Delivery charge of $4.00 for lots of 300 lb. or less. *e* F.o.b. Louviers, Colo. *f* In boroughs of Kings, Queens and Richmond, and in Manhattan south of Canal Street, add delivery charge of $6.00 per trip. †F.o.b.

40% Ammonia Gelatin price ranges in other than urban areas, per lb. (except Seismograph Grades)

	C. L. 20,000 lb. net	Tons	200 lb. lots
E. of the Miss., except Fla.	$0.115	$0.14	$0.16
W. of Miss., to Rocky Mtm. States, and Fla.	.12 –.13	.145 –.16	.165 –.18
Rocky Mtm. States	.12 –.1425	.14 –.155**	.16 –.175**
Pacific N. W. States	.1175–.13	.1475–.16	.1675–.18
Pacific S. W. States	.1150–.1275	.145 –.1525	.165 –.1725

** F.o.b. Louviers, Colo., or Butte, Mont.

PILES, TIES—F.O.B.

PILES

Prices per linear foot, pine, with bark on, f.o.b. New York; delivered from barge 1½ to 2c. per ft. additional:

			Short Leaf	
Dimensions	Points	Length	Barge	Rail
12 in. at butt	6 in.	30 to 50 ft.	$0.18	$0.195
12 in.—2 ft. from butt.	6 in.	50 to 59 ft.	.225	.24
12 in.—2 ft. from butt.	6 in.	60 to 69 ft.	.23	.255
14 in.—2 ft. from butt.	6 in.	50 to 69 ft.	.24	.265
14 in.—2 ft. from butt.	6 in.	70 to 79 ft.	.265	.275
14 in.—2 ft. from butt.	5 in.	80 to 85 ft.	.38	.415
14 in.—2 ft. from butt.	5 in.	85 to 89 ft.	.42	.482

RAILWAY TIES

Prices f.o.b., per tie, for carload lots:		6″ x 8″ x 8′		7″ x 9″ x 8′ 6″	
		Untr.	Tr.	Untr.	Tr.
Boston	Oak	$1.20	....	$1.75	....
	Pine	1.20	$1.70*a*	1.80	$2.60*a*
New York	S.L. Sap Pine	1.00/1.10	1.80*g*	1.25	2.25*g*
	Mixed Oak	1.45	....	1.75	....
Birmingham	White Oak	.85	1.50*a*	1.35	1.70*a*
	Southern Pine	.55*b*	1.10*ab*	.70	1.30*a*
Chicago	Oak	....	1.67*ac*	....	2.05*ac*
	Oak	....	1.55*d*	....	1.90*d*
	Southern Pine	....	1.50*a*	....	1.95*a*
Los Angeles	Douglas Fir	.64	1.38*a*	.90	1.80*a*
Philadelphia	Red Oak	1.25	....	....	2.60*a*
St. Louis	White Oak	1.25	....	1.60	....
	Red Oak	1.20	1.60*a*	1.50	2.00*a*
	Sap Pine or Cypress	1.05	....	1.35	....
San Francisco	Douglas Fir	.80*bef*	....	....	1.85*caf*
Montreal	Birch or Maple	.70	1.10*a*	.80	1.40*a*

Tr.—Treated; Untr.—Untreated. *a* Creosoted. *b* 6″ x 8″ x 8′ 6″ *c* Empty cell. *d* Zinc. *e* Green. *f* At ships tackle. *g* Dense pine

CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York

Bleaching powder, in drums, f.o.b. works, per 100-lb.	$2.00–2.85
Chlorine cylinders, per lb. delivered	.055
Calcium chloride, 77–80%, flaked, in 400-lb. drums or 100-lb. moisture proof bags, f.o.b. works, freight equalized with points of competition, per ton	22.00–35.00
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb.	1.25
Soda ash, 58%, in paper bags, per 100 lb. dense	1.10
Sulphate of aluminum, commercial, in 100-lb. bags, per ton	27.00
Sulphate of copper, in bbl., per 100-lb.	4.75–5.50

LUMBER, TIMBER, PLYWOOD—PER M FT. B.M., CARLOAD LOTS F.O.B.

	SHORT LEAF YELLOW PINE AND DOUGLAS FIR All S. L. Y. P. is No. 2 common or better and for No. 1 N. C. Box. (Prices in Bold Face) *All Fir planks No. 2 common; Fir timber is No. 1 common. Lengths up to 20 ft. (Prices in italics)*									LONG LEAF Y. P. Merchantable grade up to 20 ft		PLYWOOD Rail freight increment (See note for base price)	
	1x6, S4S	1x8, S4S	2x4, S4S	2x6, S4S	2x8, S4S	2x10, S4S	3x12, Rgh	6x12, Rgh	12x12, Rgh	2x12, Rgh	12x12, Rgh	⅝"	¾"
Atlanta	$15.00	$15.00	$14.50	$15.00	$15.50	$16.00	$21.00	.....	.....	$38.50	$50.00	$17.75	$21.60
Baltimore	23.00	24.00	23.00	23.00	24.00	26.00	38.00	.....	.....	62.00	65.00	17.35f	21.15f
	30.00	*30.00*	*30.00*	*29.00*	*30.00*	*30.00*	*38.00*	*$38.00*	*$36.00*	.....	.....	.....	.....
Birmingham	19.00	15.00	19.00	19.00	19.00	22.00	30.00	30.00	30.00	.....	.....	16.25	19.85
[1]	23.00	23.00	26.00	26.00	26.00	31.00	54.00	.....	.....	48.00	53.00	.....	.....
Boston	28.00[2]	28.00[2]	34.00[3]	34.00	48.00[1]	58.00[1]	72.00[1]	.....	.....	72.00	72.00	17.35	21.15f
	28.00	*28.00*	*30.00*	*32.00*	*32.00*	*34.00*	*40.00*	*40.00*	*40.00*	.....	.....	.....	.....
Chicago	25.00	25.00	26.00	26.00	26.00	27.00	45.00	.....	.....	70.00	70.00	13.15	16.05
	32.00	*32.00*	*36.00*	*36.00*	*36.00*	*38.00*	*40.00*	*40.00*	*40.00*				
Cincinnati	23.75	23.75	25.00	23.25	24.25	26.50	37.50	.....	.....	46.00	49.00	16.25	19.85
	.....	.....	.....	.....	.....	.....	*39.50*	*39.50*	*39.50*	.....	.....	.....	.....
Cleveland	28.00	29.00	35.00	29.00	37.00	38.00	48.00	.....	.....	52.00	65.00[8]	16.65	20.25
Dallas e	23.50	26.00	26.50	23.00	25.50	29.00	47.50	51.00	68.50	72.50	71.00	13.90	16.95
Denver ‡	41.00[4]	41.00[4]	43.00[4]	42.00[4]	42.00[4]	47.00[4]	50.00[4]	60.00[4]	64.50[4]	.....	.....	9.90	12.05
Detroit	24.50	24.50	25.00	25.00	26.00	26.00	35.00	.....	.....	28.50	40.00	16.25	19.85
	.....	.....	.....	.....	.....	.....	*42.00*	*42.00*	*42.00*	.....	.....	.....	.....
Kansas City	24.00	24.00	23.00	22.00	24.00	26.00	35.00	.....	.....	55.00	58.00	12.25	14.95
	28.00	*27.00*	*28.00*	*28.0C*	*28.00*	*29.00*	*34.00*	*35.00*	*35.00*	.....	.....	.....	.....
Los Angeles a	*32.00*	*32.00*	*32.00*	*32.00*	*32.00*	*32.00*	*40.00*	*44.00*	*40.00*	.....	.....	9.35fg	11.35fg
Minneapolis ‡b	43.00[5]	43.00[5]	.....	.....	.....	.....	.....	.....	.....	.....	.....	12.05	14.70
‡	*34.00*	*34.00*	*35.00*	*35.00*	*35.00*	*35.00*	*55.00*	*55.00*	*55.00*	.....	.....	.....	.....
Montreal [7]	*44.50*	*44.50*	*49.00*	47.00	48.00	58.00	84.00	.....	.....	82.00	76.00	.....	...
	40.00	*40.00*	*40.00*	*40.00*	*40.00*	*41.50*	*42.00*	*42.00*	*42.00*	.....	.....	.....	.....
New Orleans	22.00	22.00	20.00	19.00	20.00	22.00	42.00	.....	.....	58.00	65.00	13.90	16.95
	26.00	*26.00*	*28.00*	*29.00*	*32.00*	*30.00*	*32.00*	.....	.....	.....	.....	.....	.....
New York ‡	32.50	34.00	32.50	34.00	34.00	35.00	40.00	.....	.....	75.00	77.50	17.35	21.15f
‡	.....	.....	*40.00*	*40.00*	*40.00*	*40.00*	*37.00*	*41.00*	*41.00*	.....	.....	.....	.....
Philadelphia	20.50	22.00	21.50	22.00	23.00	24.00	26.50	.....	.....	65.00	65.00	17.35	21.15f
	35.00	*35.00*	*30.25*	*34.00*	*35.00*	*35.00*	*35.00*	*41.50*	*41.50*	.....	.....	.....	.....
Pittsburgh	38.10	39.90	47.05	42.00	45.65	46.90	59.70	.....	.....	.....	.....	17.00	20.70
	51.90	*49.60*	*49.60*	*49.00*	*48.90*	*49.25*	*66.55*	*66.55*	*66.55*	.....	.....	....	.....
St. Louis ‡c	27.50	28.00	26.00	25.50	26.00	29.00	46.00	*52.00*	*52.00*	72.00	71.00	13.90	16.95
San Francisco d	*19.00*	*19.00*	*19.00*	*19.00*	*19.00*	*19.00*	*23.00*	*23.00*	*23.00*	.....	.....	7.30f	8.90f
Seattle	*20.00*	*20.00*	*20.00*	*20.00*	*20.00*	*20.00*	*25.00*	*25.00*	*25.00*	.....	.....	0.00	0.00

Bold Face type, Southern Pine. *Italics, Douglas Fir.* [1] Long leaf. [2] Roofers' N.C. Pine. [3] Spruce. [4] Native. [5] Western Pine, No. 3 Common. [7] Pine. [8] Norway Pine. ‡ Delivered. *a* Yard prices. *b* Contractors discount in Minneapolis and St. Paul discontinued May 21, 1938. *c* 5M ft. or less. *d* At ship's tackle. *e* 10% discount taken off.

Note: Special concrete form grade Fir Plywood, 4' by 8' panels, 5-ply, sanded 2 sides, water resistant glue, car load lots, delivered per 1000 sq. ft. surface. Base price — Seattle: ⅝", $70.13; ¾", $80.03. For other centers add rail freight increment from table for proper size. Add: for form oil treatment, $2.50 per M. sq. ft.; for mineral paint sealed edges, $1.00 per M; for resin dipped treatment, $10.00 per M. *f* Lower rate by water shipment. *g* 50,000 lb. minimum

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS Discounts from latest jobbers list, Sept. 15, 1928 Single or Double Thickness		EXPLOSIVES Per lb. 40% Ammonia Gelatin in 50-lb. cases delivered in 200 lb. lots*
	A quality	B quality	
Atlanta	85%	87%	$0.16
Baltimore	88%	87%	.16
Birmingham	87%	89%	.115
Boston	87%	89%	.16d
Chicago	88%	89%	.16
Cincinnati	89–10%	91–10%	.16
Cleveland	85–10%	85–10%	.20
Dallas	80%	80%	.175
Denver	85%	86%	.16e
Detroit	87–10%	89–10%	.16
Kansas City	86–10%	87–10%	.165
Los Angeles	90%a	90@40%	.1675
Minneapolis	85–10%	86–10%	.165
Montreal	20.60b–12.40c		.18†
New Orleans	86%	88%	.17
New York	89%	90%	.23f
Philadelphia	89–10%	90–10%	.16
Pittsburgh	86%	87%	.1525
St. Louis	86–10%	87–10%	.165
San Francisco	78%	83%	.165
Seattle	83%	86%	.1675

Price of 60% Ammonia Gelatin is $0.015 per lb. higher than 40%

a Disc. from list Aug. 1, 1929. *b* Double, to 40", 100 sq. ft. *c* Single, to 40", 100 sq. ft.

*Urban prices influenced by service charges or local storage and delivery regulations, do not consistently reflect quantity prices in less congested areas. *d* Delivery charge of $4.00 for lots of 300 lb. or less. *e* F.o.b. Louviers, Colo. *f* In boroughs of Kings, Queens and Richmond, and in Manhattan south of Canal Street, add delivery charge of $6.00 per trip. †F.o.b.

40% Ammonia Gelatin price ranges in other than urban areas, per lb. (except Seismograph Grades)

	C/L 20,000 lb. net	Tons	200 lb. lots
E. of the Miss., except Fla.	$0.115	$0.14	$0.16
W. of Miss., to Rocky Mtn. States, and Fla.	.12 –.13	.145 –.16	.165 –.18
Rocky Mtn. States	.12 –.1425	.14 –.155**	.16 –.175**e**
Pacific N. W. States	.1175–.13	.1475–.16	.1675–.18
Pacific S. W. States	.1150–.1275	.145 –.1525	.165 –.1725

** F.o.b. Louviers, Colo., or Butte, Mont.

PILES, TIES—F.O.B.

PILES

Prices per linear foot, pine, with bark on, f.o.b. New York; delivered from barge 1½ to 2c. per ft. additional:

Dimensions	Points	Length	Short Leaf Barge	 Rail
12 in. at butt	6 in.	30 to 50 ft.	$0.18	$0.195
12 in.—2 ft. from butt.	6 in.	50 to 59 ft.	.225	.24
12 in.—2 ft. from butt.	6 in.	60 to 69 ft.	.23	.255
14 in.—2 ft. from butt.	6 in.	50 to 69 ft.	.24	.265
14 in.—2 ft. from butt.	6 in.	70 to 79 ft.	.28	.275
14 in.—2 ft. from butt.	5 in.	80 to 85 ft.	.40	.415
14 in.—2 ft. from butt.	5 in.	85 to 89 ft.	.42	.482

RAILWAY TIES

Prices f.o.b., per tie, for carload lots:		6" x 8" x 8' Untr.	 Tr.	7" x 9" x 8' 6" Untr.	 Tr.
Boston	Oak	$1.20	....	$1.75	....
	Pine	1.25	$1.85a	1.85	$2.70a
New York	S.L. Sap Pine	1.00/1.10	1.80g	1.25	2.25g
	Mixed Oak	1.45	....	1.75	....
Birmingham	White Oak	.85	1.50a	1.35	1.70a
	Southern Pine	.55b	1.10ab	.70	1.30a
Chicago	Oak	....	1.67ac	....	2.05ac
	Oak	....	1.55d	....	1.90d
	Southern Pine	....	1.50a	....	1.95a
Los Angeles	Douglas Fir	.64	1.38a	.90	1.80a
Philadelphia	Red Oak	1.15	....	....	2.40a
St. Louis	White Oak	1.95	....	1.20	....
	Red Oak	1.95	1.45a	1.20	1.80a
	Sap Pine or Cypress	.75	....	1.00	....
San Francisco	Douglas Fir	.80bef	....	....	1.85caj
Montreal	Birch or Maple	.65	1.05a	.75	1.35a

Tr.—Treated; Untr.—Untreated. *a* Creosoted. *b* 6" x 8" x 8' 6" *c* Empty cell. *d* Zinc. *e* Green. *f* At ships tackle. *g* Dense pine

CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York

Bleaching powder, in drums, f.o.b. works, per 100-lb.	$2.00–2.85
Chlorine cylinders, per lb. delivered	.05
Calcium chloride, 77–80%, flaked, in 400-lb. drums or 100-lb. moisture proof bags, f.o.b. works, freight equalized with points of competition, per ton	22.00–35.00
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb.	1.40
Soda ash, 58%, in paper bags, per 100 lb. dense	1.10
Sulphate of aluminum, commercial, in 100-lb. bags, per ton	23.00
Sulphate of copper, in bbl., per 100-lb.	4.00

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

	STRUCTURAL CLAY TILE—PARTITION—SCORED Per M, lots of 2,000 pieces or over, 3x12x12 in.	4x12x12 in.	8x12x12 in.	STRUCTURAL CLAY TILE—LOAD BEARING—SCORED Per M, lots of 2,000 pieces or over, 8x12x12 in.	10x12x12 in.	12x12x12 in.	BRICK Per M, in quantity, Common backing	Straight hard	LIME Per ton, Hydrated finishing	in paper, Common hydrated	carload Pulverized or lump
Atlanta	$63.20	$67.40	$126.30	$126.30	$147.40	$168.40	$10.40	$15.15	$19.50	$13.50	$13.50
Baltimore	93.00	100.00	185.00	225.00	320.00	395.00	13.00	17.00	20.00	15.00	25.00
Birmingham	78.75	84.00	157.50	189.00	201.25	242.00	15.00	19.00	3.00o	1.75o	2.25
Boston	86.25ab	92.00ab	172.50ab	195.90ab	211.65ab	242.00a	16.00i	19.00i	19.00	15.00	3.50
Chicago	66.00	70.50	132.00	180.00	228.00	260.00	11.00	12.00	15.50	14.00	12.00
Cincinnati	56.45	60.40	115.25	138.70	166.50	206.40	17.50	17.50	15.90	13.00	.....
Cleveland	52.50	56.00	105.00	126.00	170.00	194.50	16.50	16.50	16.80j	14.40j	2.65m
Dallas	59.00	62.00	125.00	149.00	155.00	177.00	9.50	24.00	19.00	16.00	.95
Denver	78.50	88.00	141.50	166.50	196.00	225.50	12.00	15.50	25.00j	17.00j	25.00
Detroit	71.85	76.65	143.70	230.00	280.00	325.00	16.00	17.00	19.00	16.00	16.00
Kansas City	64.50	66.50	81.00c	125.50	159.75	186.25	14.00	24.00	18.90	12.60	10.50
Los Angeles	73.50†r	89.50†r	128.00c†r	210.00†r	368.00†r	460.00†r	12.00	14.00	18.70	.....	19.70
Minneapolis	80.35	85.70	146.00	192.85	176.20d	245.20d	13.10	15.10g	21.00	16.00	19.00
Montreal	84.00a	96.00a	180.00a	......	273.00	......	15.50†	20.75†	23.50	17.00	11.00
New Orleans	72.00	72.00	135.00	162.00	180.00	226.00	14.00	.....	18.30	12.60	.....
New York	87.00	93.00	128.00c	193.30h	238.80h	295.60h	12.50	.....	20.00	15.50	20.00
Philadelphia	80.50	85.90	161.10	193.30	238.80	295.60	.....	.....	16.10q	11.40q	10.90q
Pittsburgh	58.40	62.30	116.85	175.35	229.90	262.75	17.50	25.00	17.50	15.00	2.40m
St. Louis	62.00	65.08	120.00	180.00	234.00	280.00	16.00	17.00	22.00	.40k	2.25m
San Francisco	84.00	94.50	225.00	......	......	......	14.00	17.00	.55o	.40o	2.05m
Seattle	90.00	100.00	200.00	......	......	......	18.00f	18.00f	20.00s	20.00s	20.00s

a Smooth. *b* Carload lots delivered to job. *c* 6 x 12 x 12 in. *d* Not load bearing. *e* 8 x 8 x 8 in. only. *f* Less $1.00, ½ cash 15 days, balance 30 days. *g* Selected common. *h* F.o.b. Perth Amboy, N. J. *i* 50c per M off for cash. *j* LCL. *k* Per sack. *l* Lump. *m* Per bbl., 180 lb. *n* Per sack 100 lb. *o* Per bbl., 200 lb. *p* 280 lb. bag. *q* 15-ton cars. *r* 5% discount 10 days. *s* 2% off cash. † F.o.b.

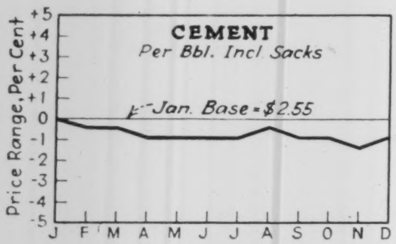
PAINT, ROOFING—F.O.B. CARLOAD LOTS

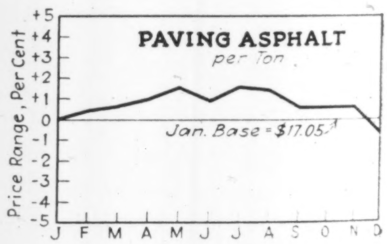
	RED LEAD Per 100 lb. in 600-lb. (Approx.) bbl. Dry *a*	WHITE LEAD Per 100 lb. in oil	READY-MIXED PAINT Per gal., drums Graphite *b*	Aluminum *c*	Ferric Oxide *d*	ROOFING SUPPLIES Carload lots f. o. b factory Rolls, slate surfaced, 85-90 lb., per sq.	Asphalt felt, per 100 lb.	Tar felt, per 100 lb.	Asphalt coating per gal.	Tar pitch, 350 lb. bbl., per ton
Atlanta	$9.00	$11.875	$1.62	$3.17	$1.40	$2.00*l*	$2.00*l*	$2.36*l*	$.36*l*	$28.00
Baltimore	8.75	11.50	1.45	2.25	1.70	2.16	2.75	2.75	.40	27.50
Birmingham	9.00	11.875	2.35	2.35	1.85	2.17	2.25	2.25	.45	30.37
Boston	8.75	11.50	2.00‡	2.30‡	2.11‡	1.96‡	2.25*h*‡	2.14*h*‡	.45‡	20.00‡
Chicago	8.75	11.50	1.80	....	....	2.47	2.37	2.37	.43	33.00
Cincinnati	8.75	11.50	1.45	2.50	1.40	2.40	2.39*h*	2.39*h*	.36	21.00
Cleveland	8.75	11.50	1.90	2.60	1.40	2.10	2.04*h*	2.04*h*	.305	27.50
Dallas	9.00	12.25	1.80	2.10	....	2.75*h*	2.50*h*	2.50*h*	.60	60.00
Denver	9.25	12.00	....	....	....	2.45	4.00	3.00	.35	28.00
Detroit	8.75	11.50	1.90	2.50	1.50	2.30	3.15	3.00	.35	30.00
Kansas City	8.75	11.625	2.15*g*	2.40*g*	1.67*g*	1.93	2.09	2.09	.25	25.00
Los Angeles	9.00	11.75	1.60	2.25	2.30	2.10	1.50	....	.45	.....
Minneapolis	8.75	11.625	....	....	....	1.85*i*	1.78*hi*	1.78*hi*	.29	23.80
Montreal	.....	8.20	2.00*f*	4.75*f*	2.40*f*	2.50	1.60	1.83	.60	1.55*j*
New York	8.75	11.50	1.90	2.60	1.65	1.65	1.80*h*	1.80*h*	.033*e*	24.00
Philadelphia	8.75	11.50	2.515	2.94	1.515	1.95	2.86*h*	2.86*h*	.29	26.00
Pittsburgh	8.75	11.50	1.05	1.95	.80	1.95	1.94*h*	1.94*h*	.34	26.00
St. Louis	8.75	11.50	1.70/1.90	2.50/2.75	1.50/1.90	1.90/2.00*h*	2.70/2.80	2.70/2.80	.25/.35	28.00/30.00
San Francisco	9.00	11.50	1.80	2.75	1.10–2.00	1.80	2.62	2.62	.36	18.00
Seattle	9.00	11.75	1.80	2.85	2.20	1.98	2.42	2.60	.73	28.00*k*

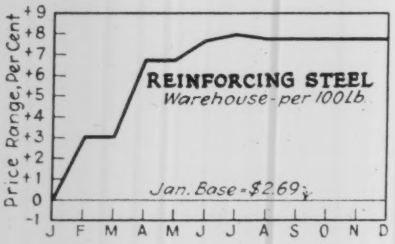
‡ Delivered. Note: Red lead in oil 50c. higher than white lead in oil. *a* Red lead prices change frequently due to pig lead price changes. *b* U. S. War Dept. Spec. 3-49A. *c* ASTM Spec. D266–31. *d* 80% maximum ferric oxide. *e* Per lb. *f* Sales tax extra. *g* 5 gal. cans. *h* Per roll, 65 lb. *i* Minneapolis and vicinity. *j* Per 100 lb. *k* Asphalt pitch. *l* Downward revision in Mid-December, not yet definite.

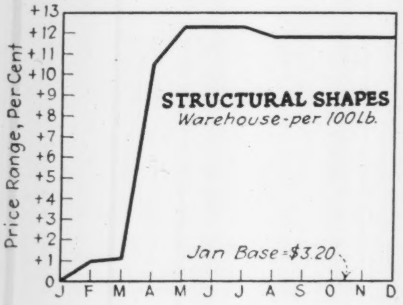
1937 Price Trends

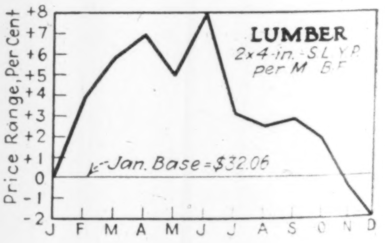
Range of prices of important construction commodities during 1937, based on prices prevailing at the first of the year. The figures are the average of the twenty cities listed in the above tables.











STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

	STRUCTURAL CLAY TILE—PARTITION—SCORED Per M, lots of 2,000 pieces or over,			STRUCTURAL CLAY TILE—LOAD BEARING—SCORED Per M, lots of 2,000 pieces or over,			BRICK Per M, in quantity,		LIME Per ton,	in paper,	carload lot,
	3x12x12 in.	4x12x12 in.	8x12x12 in.	8x12x12 in.	10x12x12 in.	12x12x12 in.	Common backing	Straight hard	Hydrated finishing	Common hydrated	Pulverized or lump
Atlanta	$100.00	$120.00	$200.00	$230.00	$240.00	$250.00	$11.00	$16.00	$24.00	$16.50	$16.50
Baltimore	70.00	75.00	160.00	190.00	240.00	290.00	13.00	17.00	16.00	15.00	25.00
Birmingham	78.75	84.00	157.50	189.00	201.25	242.00	15.00	19.00	3.00*o*	1.75*o*	2.25*lo*
Boston	90.75*ab*	96.80*ab*	181.50*ab*	205.70*ab*	266.70*ab*	304.80*a*	16.00*i*	19.00*i*	20.00	13.50	3.25*lp*
Chicago	68.10	72.60	135.90	185.70	234.90	268.10	11.00	12.00	16.40	14.40	12.50
Cincinnati	56.45	60.40	115.25	138.70	166.50	206.40	16.00	16.00	15.90	13.00	.....
Cleveland	52.50	56.00	105.00	126.00	170.00	194.50	16.50	16.50	16.80*j*	14.40*j*	2.65*jm*
Dallas	58.50	63.00	127.50	153.00	168.00	250.00	10.50*i*	13.50*i*	16.00	15.00	95*n*
Denver	78.50	88.00	141.50	166.50	196.00	225.50	12.00	15.50	25.00*j*	17.00*j*	25.00*j*
Detroit	68.90	73.50	137.80	175.50	232.00	265.00*u*	16.00	17.00	15.50	13.50	13.50
Kansas City	64.50	66.50	81.00*c*	125.50	159.75	186.25	14.00	24.00	19.10	12.80	10.70
Los Angeles	73.50†*r*	89.50†*r*	128.00*c*†*r*	210.00†*r*	368.00†*r*	460.00†*r*	12.00	14.00	18.70	....	19.70
Minneapolis	80.35	85.70	146.00	192.85	176.20*d*	245.20*d*	13.10	15.10*g*	21.00	16.00	19.00
Montreal	84.00*a*	96.00*a*	180.00*a*	96.00*at*	273.00	120.00*k*	20.75	28.00	23.00	17.00	10.50
New Orleans	72.00	72.00	135.00	162.00	210.00	260.00	14.00	14.00	18.30	12.08	14.10
New York	87.00	93.00	128.00*c*	193.30*h*	238.80*h*	295.60*h*	13.00	.....	20.00	15.00	18.00
Philadelphia	80.50	85.90	161.10	193.30	252.00	312.00	.....	.....	16.50*q*	11.60*q*	11.10*q*
Pittsburgh	58.40	62.40	116.85	175.35	229.90	262.75	17.50	25.00	17.70	15.20	2.57*m*
St. Louis	62.00	65.00	120.00	180.00	234.00	280.00	16.00	17.00	22.00	16.00	2.30*lm*
San Francisco	84.00	94.50	225.00	......	......	......	14.00	17.00	.55*o*	.40*o*	2.05*m*
Seattle	90.00	100.00	200.00	......	......	......	18.00*f*	18.00*f*	20.00*s*	20.00*s*	20.00*s*

a Smooth. *b* Carload lots delivered to job. *c* 6 x 12 x 12 in. *d* Not load bearing. *e* 8 x 8 x 8 in. only. *f* Less $1.00, ⅓ cash 15 days, balance 30 days. *g* Selected common. *h* F.o.b. Perth Amboy, N. J. *i* 50c per M off for cash. *j* LCL. *k* 5¼ x 12 x 12. *l* Lump. *m* Per bbl., 180 lb. *n* Per sack 100 lb. *o* Per bbl., 200 lb. *p* 280 lb. bag. *q* 15-ton cars. *r* 5% discount 10 days. *s* 2% off cash. *t* 5½ x 8 x 12. *u* 48 lb. tile. † F. o. b.

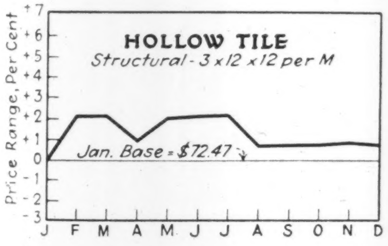
PAINT, ROOFING—F.O.B. CARLOAD LOTS

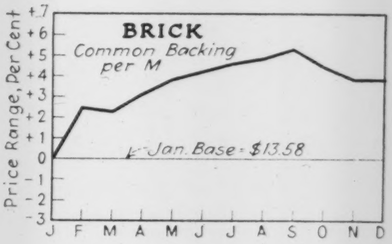
	RED LEAD Per 100 lb. in 600-lb. (Approx.) bbl. Dry *a*	WHITE LEAD Per 100 lb. in oil	READY-MIXED PAINT Per gal., drums Graphite *b*	Aluminum *c*	Ferric Oxide *d*	ROOFING SUPPLIES Carload lots f. o. b. factory Rolls, slate surfaced, 85-90 lb., per sq.	Asphalt felt, per 100 lb.	Tar felt, per 100 lb.	Asphalt coating per gal.	Tar pitch, 350 lb. bbl per ton
Atlanta	$8.00	$10.625	$1.30	$2.25	$1.20	$2.00	$1.99	$1.99	$.36	$26.00
Baltimore	7.75	10.25	1.45	2.25	1.70	2.16	2.75	2.75	.40	27.50
Birmingham	8.00	10.625	2.35	2.35	1.85	2.07	2.03	2.03	.45	30.37
Boston	7.75	10.25	1.90‡	2.30‡	2.00‡	1.81‡	2.00*h*‡	2.00*h*‡	.40‡	20.00‡
Chicago	7.75	10.25	1.80	....	....	1.53*hl*	1.59*hl*	1.59*hl*	.26*l*	23.00*l*
Cincinnati	7.75	10.25	1.45	2.50	1.40	2.40	2.39*h*	2.39*h*	.36	21.00
Cleveland	7.75	10.25	1.90	2.60	1.40	1.40	1.45*h*	1.45*h*	.23	21.00
Dallas	8.00	11.00	1.80	2.10	....	2.75*h*	2.50*h*	2.50*h*	.60	.....
Denver	8.25	10.75	....	....	....	2.45	4.00	3.00	.35	28.00
Detroit	7.75	10.25	1.90	2.50	1.50	2.30	3.00	3.00	.35	30.00
Kansas City	7.75	10.375	2.15*g*	2.40*g*	1.67*g*	1.93	2.09	2.09	.25	25.00
Los Angeles	8.00	10.50	1.60	2.25	2.30	2.10	1.50	....	.45	.....
Minneapolis	7.75	10.375	....	....	....	1.40*i*	1.45*hi*	1.45*hi*	.29	24.30
Montreal	9.75	8.20	2.00*f*	4.75*f*	2.40	2.50	1.60	1.83	.50	1.53*j*
New York	7.75	10.25	1.80	2.48	1.50	1.40*m*	1.45*hm*	1.45*hm*	.23	24.00
Philadelphia	7.75	10.25	2.515	2.94	1.515	1.95	2.86*h*	2.86*h*	.29	26.00
Pittsburgh	7.75	10.25	1.05	1.95	.80	1.95	1.94*h*	1.94*h*	.34	26.00
St. Louis	7.75	10.25	1.70/1.90	2.50/2.75	1.50/1.90	1.90/2.00*he*	2.70/2.80*e*	2.70/2.80*e*	.25/.35*e*	28.00/30.00*e*
San Francisco	8.00	10.25	1.80	2.75	1.10/2.00	1.66	1.90	1.90	.325	20.50
Seattle	8.00	10.50	1.80	2.85	2.20	2.02	2.82/3.15	2.60	.71	28.00*k*

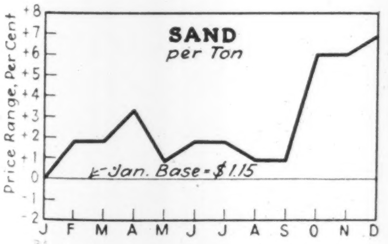
‡ Delivered. Note: Red lead in oil 50c. higher than white lead in oil. *a* Red lead prices change frequently due to pig lead price changes. *b* U. S. War Dept. Spec. 3-49A. *c* ASTM Spec. D266-31. *d* 80% maximum ferric oxide. *e* Market unsettled; prices approximate. *f* Sales tax extra. *g* 5 gal. cans. *h* Per roll, 65 lb. *i* Minneapolis and vicinity. *j* Per 100 lb. *k* Asphalt pitch Distributors' price to contractors. *m* Proposed increase not in effect until July 1.

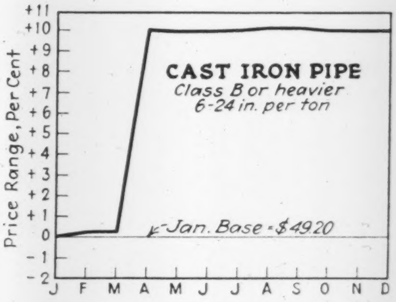
1937 Price Trends

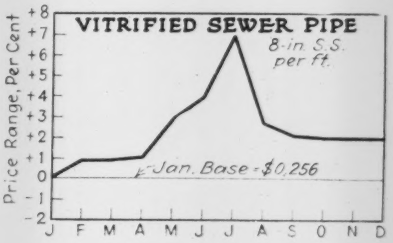
Range of prices of important construction commodities during 1937, based on prices prevailing at the first of the year. The figures are the average of the twenty cities listed in the above tables.



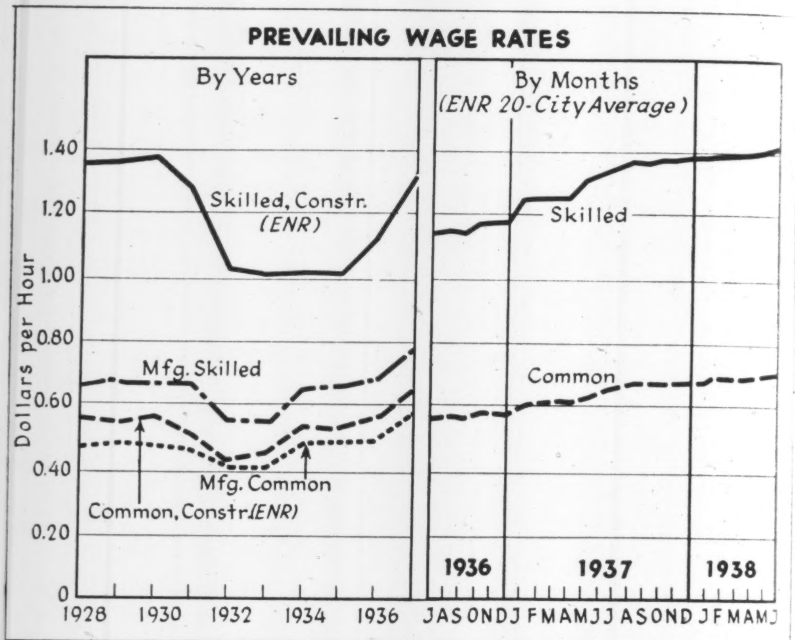








Construction Wage Rates and Trends



From 1934 to the start of 1937 construction wage rates rose steadily, then broke into a sharper rise that carried them above 1929 levels to all-time highs. Since last Fall wage rates have leveled off, in fact the prevailing average of unskilled wages in twenty cities showed a slight drop early this year, though they have recovered within the past few weeks. The skilled rate average has increased slowly since the spurt in the first half of 1937.

By the end of 1937 the twenty-city average for skilled labor, at $1.39, had risen to 102 per cent of the 1929 value, but the average for the year, $1.32, was only 97 per cent of the 1929 level. Since 1932, skilled rates have advanced some 30 per cent. Unskilled construction wage rates in the twenty cities averaged 64.5c. in 1937, and closed the year at 67.8c., representing gains of 18 and 24 per cent, respectively, over the 1929 average.

The rise in construction labor costs is due not so much to the increase of top-scale rates as to the raising of bottom-scales. In most localities, where formerly a differential existed between union and non-union scales, the gap has closed up, and the top rates now prevail. This is also true of the differentials formerly existing between rates in metropolitan centers and the outside. The closing up of the wage scale spreads is due to the influence of "prevailing wage" requirements in public works contracts—almost invariably interpreted as union or the higher scale—and to the growth of unions in the heavy construction field and in open-shop building areas.

The rise in labor rates per hour is only part of the story of increased labor costs in construction, for many trades are now working only 7 hr. or even 6 hr. per day. Naturally, on projects worked 8 hr. per day, these curtailed periods by certain trades disrupt the efficiency of the construction schedule. In New York, for example, laborers and ironworkers work 8 hr., bricklayers, carpenters and hoisting

Construction Wages—Rates per Hour

20 Cities Average Reported by Engineering News-Record

	Construction Wages		—Earnings—	
	Skilled Aver.†	Common	Mfg. (1)	Mfg. (2)
1910	$0.525	$0.179	....	....
1911	.534	.179	....	....
1912	.542	.182	....	....
1913	.555	.19	....	....
1914	.565	.177	....	....
1915	.57	.182	....	....
1916	.58	.192	....	....
1917	.61	.281	....	....
1918	.68	.38	....	....
1919	.78	.466	....	....
1920	1.05	.579	$0.692	$0.548
1921	1.06	.54	.599	.438
1922	1.01	.442	.567	.402
1923	1.10	.518	.619	.443

Skilled Labor†*

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
J	$1.16	$1.21	$1.24	$1.28	$1.34	$1.35	$1.37	$1.37	$1.15	$0.989	$1.054	$1.108	$1.119	$1.22	$1.39
F	1.16	1.21	1.24	1.32	1.34	1.35	1.38	1.37	1.11	.996	1.062	1.104	1.119	1.24	1.39
M	1.16	1.21	1.24	1.32	1.34	1.35	1.38	1.36	1.11	.991	1.069	1.092	1.132	1.25	1.40
A	1.17	1.22	1.25	1.30	1.35	1.35	1.38	1.36	.95	.997	1.084	1.093	1.134	1.26	1.40
M	1.20	1.22	1.26	1.31	1.36	1.35	1.38	1.36	.96	.998	1.101	1.081	1.138	1.30	1.40
J	1.21	1.23	1.27	1.33	1.35	1.36	1.38	1.32	.99	.994	1.101	1.074	1.138	1.33	1.41
J	1.20	1.22	1.27	1.33	1.35	1.36	1.38	1.23	1.00	.985	1.104	1.077	1.150	1.35	....
A	1.20	1.23	1.28	1.34	1.35	1.37	1.39	1.19	.98	.986	1.110	1.088	1.159	1.37	....
S	1.20	1.23	1.28	1.34	1.35	1.37	1.39	1.19	.99	1.016	1.119	1.088	1.159	1.37	....
O	1.21	1.23	1.29	1.33	1.35	1.37	1.39	1.17	.98	1.029	1.120	1.104	1.176	1.38	....
N	1.21	1.23	1.29	1.34	1.35	1.37	1.39	1.16	.97	1.037	1.120	1.101	1.178	1.38	....
D	1.21	1.24	1.29	1.33	1.35	1.37	1.39	1.15	.98	1.062	1.120	1.101	1.180	1.39	....
Aver.	**1.19**	**1.22**	**1.27**	**1.32**	**1.35**	**1.36**	**1.38**	**1.27**	**1.02**	**1.006**	**1.097**	**1.093**	**1.149**	**1.32**	....
Mfg.(1)	.644	.644	.651	.656	.659	.668	.662	.634	.559	.55	.642	.662	.685	.78	....

Common Labor*

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
J	$0.54	$0.55½	$0.54	$0.55¾	$0.55	$0.559	$0.5628	$0.5384	$0.4524	$0.4271	$0.5158	$0.5376	$0.547	$0.603	$0.680
F	.54	.54	.54	.55¾	.54¾	.564	.5628	.5428	.4521	.4285	.5268	.5241	.547	.603	.675
M	.55	.54½	.54½	.56	.54¾	.5509	.5610	.5371	.4358	.4272	.5268	.5243	.547	.612	.675
A	.55	.54½	.54½	.56	.55	.529	.5646	.5359	.4122	.4343	.5343	.5255	.552	.612	.677
M	.56	.54	.55	.55⅓	.55	.5315	.5628	.5394	.4105	.4442	.5343	.5233	.558	.627	.673
J	.56	.53	.55	.55⅓	.55⅓	.534	.5628	.5394	.4121	.4393	.5343	.5269	.564	.644	.677
J	.56	.53	.55½	.55⅓	.55¾	.5296	.5615	.4721	.4114	.4430	.5300	.5289	.563	.662	....
A	.56	.53	.55⅓	.55⅓	.5607	.5353	.5615	.4634	.4220	.4430	.5300	.5285	.569	.668	....
S	.56	.53	.55⅓	.55⅓	.5607	.5496	.5609	.4665	.4308	.4524	.5349	.5285	.569	.673	....
O	.56	.54	.55	.54⅓	.5628	.5496	.5596	.4584	.4308	.5057	.5363	.5285	.583	.676	....
N	.56	.54	.55⅓	.54⅓	.5653	.5603	.5587	.4559	.4260	.5102	.5388	.5275	.583	.678	....
D	.56⅓	.54	.55⅓	.55	.5628	.5653	.5503	.4534	.4273	.5202	.5413	.5275	.586	.678	....
Aver.	**.555**	**.538**	**.548**	**.554**	**.5558**	**.5465**	**.5607**	**.5002**	**.4269**	**.4562**	**.5319**	**.5276**	**.564**	**.645**	....
Mfr.(2)	.459	.455	.461	.472	.474	.486	.478	.461	.401	.401	.478	.494	.498	.568	....

NOTES:

†EN-R Skilled Average for 20 cities represents rates for bricklayers, carpenters, iron workers.

(1) Skilled and Semi-skilled.
(2) Unskilled.
Both represent earnings per hour as reported by National Industrial Conference Board.

*Checked monthly and new value reported in first issue of *Engineering News-Record* each month.

engineers 7 hr., and plasterers 6 hr. The history and trend of construction labor wage rates are portrayed by charts and tables on this and the following three pages. The rates prevailing on Feb. 15, 1938, as shown on the next page, will not change much during the remainder of this year, according to the present outlook.

Wage Rates per Hour New York City

	Carpenters, 10 Hr. Day	Bricklayers, 8 Hr. Day	Masons' Laborers, 8 Hr. Day	Common Laborers, 10 Hr. Day	Structural Iron-Workers
1874	$0.23	$0.43	$0.18	$0.14	.....
1875	.22½	.37	.18	.14	.....
1876	.21	.31	.17	.14	.....
1877	.20	.31	.15	.12	.....
1878	.18	.31	.15	.11	.....
1879	.17	.31	.16	.11	.....
1880	.18	.34	.18	.12	.....
1881	.19	.46	.21	.13	.....
1882	.21	.50	.22	.15	.....
1883	.21	.50	.23	.13	.....
1884	.21	.50	.22	.13	.....
1885	.20	.50	.22	.13	.....
1886	.21	.50	.23	.13	.....
1887	.21	.50	.20	.14	.....
1888	.22	.50	.16	.12	.....
1889	.22	.50	.23	.13	.....
	8 Hr. Day			9 Hr. Day	
1890	.43	.47	.28	.14	.....
1891	.43	.47	.28	.14	.....
1892	.44	.50	.29	.14	.....
1893	.43	.50	.30	.14	.....
1894	.44	.50	.30	.14	.....
1895	.43	.50	.30	.14	.....
1896	.44	.50	.30	.14	.....
1897	.44	.50	.29	.14	.....
1898	.44	.50	.30	.14	.....
1899	.45	.55	.33	.14	.....
1900	.50	.56	.33	.14	.....
1901	.50	.59	.33	.19	.....
1902	.51	.65	.36	.17	.....
1903	.56	.65	.36	.16	.....
1904	.53	.65	.36	.19	.....
1905	.54	.70	.36	.20	.....
1906	.58	.70	.38	.21	.....
				—8 Hr. Day—	
1907	.62½	.70	.37½	.22	$0.60
1908	.62½	.70	.37½	.22	.60
1909	.62½	.70	.37½	.22	.60
1910	.62½	.70	.37½	.22	.62½
1911	.62½	.70	.37½	.22	.62½
1912	.62½	.70	.37½	.23	.62½
1913	.62½	.70	.37½	.22½	.62½
1914	.62½	.75	.37½	.22½	.62½
1915	.62½	.75	.37½	.25	.62½
1916	.62½	.75	.37½	.25	.66
1917	.69	.75	.42½	.30	.68
1918	.69	.81	.47	.40½	.80
1919	.75	.87½	.57½	.40½	.87½
1920	1.12½	1.25	.77½	.75	1.12½
1921	1.12½	1.25	.87½	.60	1.12½
1922	1.12½	1.25	.87½	.60	1.12½
1923	1.12½	1.50	.95	.61½	1.12½
1924	1.31¼	1.50	1.00	.68¾	1.29
1925	1.31¼	1.50	1.00	.65¼	1.46¾
1926	1.45	1.64½	1.07	.81¼	1.60
1927	1.50	1.75	1.12½	.90⅝	1.75
1928	1.50	1.75	1.12½	.90⅝	1.75
1929	1.55	1.84	1.15	.98½	1.81
1930	1.65	1.92½	1.03⅛	1.03⅛	1.92½
1931	1.45	1.71¼	1.02½	.65⅝	1.92½
1932	1.33	1.47	1.00	.64½	1.67½
1933	1.37½	1.57½	.91	.72½	1.65
1934	1.40	1.53	.82½	.84¾	1.62
1935	1.40	1.50	.82½	.68	1.65
1936	1.40	1.50	.82½	.65	1.58
1937	1.60	1.73	.91	.76	1.79
		1937 by Months			
Jan.	1.40	1.50	.82½	50 /80	1.65
Feb.	1.40	1.50	.82½	50 /80	1.65
Mar.	1.40	1.50	.82½	50 /80	1.65
April	1.40	1.50	.82½	50 /80	1.65
May	1.40	1.50	.95	60 /80	1.65
June	1.75*	1.88½*	.95	60 /85	1.65
July	1.75	1.88½	.95	60 /85	1.92½
Aug.	1.75	1.88½	.95	60 /85	1.92½
Sep.	1.75	1.88½	.95	87½/95	1.92½
Oct.	1.75	1.88½	.95	87½/95	1.92½
Nov.	1.75	1.88½	.95	87½/95	1.92½
Dec.	1.75	1.88½	.95	87½/95	1.92½
		1938 by Months			
Jan.	1.75	1.88½	.95	87½/95	1.92½
Feb.	1.75	1.88½	.95	87½/95	1.92½
Mar.	1.75	1.88½	.95	89½/95	1.92½
April	1.75	1.88½	.95	87½/95	1.92½
May	1.75	1.88½	.95	87½/95	1.92½
June	1.75	1.88½	1.03	87½/95	1.92½

* Start of 7-hour day.

Spot Wage Rates at Six-Month Intervals

Twenty Cities—1937-1938

July, 1937

	Bricklayers	Carpenters	Struct. Iron Workers	Hoisting Engineers	Plasterers	Common Labor: Building	Common Labor: Heavy Const.
Atlanta......	$1.25	$0.40/1.00	$1.00/1.25	$1.00/1.25	$1.25	$0.40/.50	$0.40/.50
Baltimore....	1.25	1.25	1.375	1.50	1.25	.45	.45
Birmingham..	1.50	1.125	1.25	1.125	1.00	.30/.40*a*	.30/.40*a*
Boston......	1.50	.90/1.375	1.375	1.00/1.375	1.625	.60/.85	.60/.85
Chicago......	1.70	1.625	1.625	1.625	1.70	1.025	1.025
Cincinnati....	1.00/1.625	.70/1.35	1.40	1.00/1.40	1.00/1.625	.60/.75	.60/.75
Cleveland....	1.625	1.375	1.50	1.50	1.50	.90	.90
Dallas.......	1.25	1.00	1.00	1.00	1.25	.40	.40
Denver......	1.50	1.50	1.43	....	1.43	.714	.714
Detroit......	1.50	1.25	1.25	1.25	1.55	.60/.80	.60/.80
Kansas City..	1.325	1.25	1.25	1.25	1.45	.80	.45/.50
Los Angeles..	1.10	1.10	1.125	1.25	1.25	.625	.625
Minneapolis..	1.375	1.25	1.50	1.40	1.50	.85	.85
New Orleans..	1.00	.75/1.00	1.00/1.25	1.00	1.00	.30/.40	.30/.40
New York....	1.886*b*	1.75*b*	1.925	2.00*b*	2.00*c*	.95	.60/.85
Philadelphia..	1.50	1.00	1.375	1.50	1.375	.40/.50	.40/.50
Pittsburgh...	1.75	1.50	1.50	1.25	1.75	.80	.70
St. Louis.....	1.50	1.25	1.75	1.57/1.75	1.50	.875	.45/.875
San Francisco	1.50	1.125	1.375	1.125	1.50	.75	.60
Seattle.......	1.50	1.335	1.375	1.375	1.50	.90	.90
Montreal....	.70	.60	.65	.55	.70	.40	.35

a PWA *b* 7 hr. day. *c* 6 hr. day.

December, 1937

	Bricklayers	Carpenters	Struct. Iron Workers	Hoisting Engineers	Plasterers	Common Labor: Building	Common Labor: Heavy Const.
Atlanta......	$1.25	$1.00	$1.25	$1.00/1.25	$1.25	$0.40/.50	$0.40/.50
Baltimore....	1.50	1.25	1.50	1.50	1.25	.50	.50
Birmingham..	1.50	1.125	1.25	1.125	1.00	.30/.40*a*	.30/.40*a*
Boston......	1.50	.90/1.375	1.375	1.00/1.375	1.625	.60/.85	.60/.85
Chicago......	1.70	1.625	1.70	1.625	1.70	1.025	1.025
Cincinnati....	1.00/1.625	.70/1.35	1.40	1.00/1.40	1.00/1.625	.60/.75	.60/.75
Cleveland....	1.625	1.375	1.50	1.50	1.50	.90	.90
Dallas.......	1.25	1.00	1.00	1.00	1.25	.40	.40
Denver......	1.50*b*	1.50*b*	1.43*b*	....	1.43*b*	.714*b*	.714*b*
Detroit......	1.50	1.25	1.50	1.50	1.55	.75/.80	.75/.80
Kansas City..	1.50	1.375	1.50	1.50	1.575	.85	.45/.50
Los Angeles..	1.10	1.10	1.125	1.25	1.25	.625	.625
Minneapolis..	1.375	1.25*d*	1.50	1.40	1.50*e*	.85	.85
New Orleans..	1.00	.75/1.00	1.00/1.25	1.00	1.00	.30/.40	.30/.40
New York....	1.886*b*	1.75*b*	1.925	2.00*b*	2.00*c*	.95	.875/.95
Philadelphia..	1.50	1.00	1.375	1.50	1.375	.40/.50	.40/.50
Pittsburgh...	1.75	1.50	1.50	1.25	1.75	.80	.70
St. Louis.....	1.50	1.25	1.75	1.57/1.75	1.58	.875	.45/.875
San Francisco	1.75*c*	1.50	1.50	1.50	1.65*c*	.75	.65
Seattle.......	1.60*c*	1.25*c*	1.50*c*	1.50*c*	1.60*c*	.90*c*	1.00*c*
Montreal....	.80	.70	.75	.70	.80	.40	.35

a PWA *b* 7 hr. day. *c* 6 hr. day. *d* 35 hr. wk. *e* 30 hr. wk.

June, 1938

	Bricklayers	Carpenters	Struct. Iron Workers	Hoisting Engineers	Plasterers	Common Labor: Building	Common Labor: Heavy Const.
Atlanta......	$1.25	$1.00	$1.25	$1.00/1.25	$1.25	$0.40/.50	$0.40/.50
Baltimore....	1.50	1.25	1.50	1.50	1.25	.50	.50
Birmingham..	1.50	1.125	1.25	1.125	1.00	.30/.40*a*	30/.40*a*
Boston......	1.50	1.375	1.50	1.375	1.625	.60/.85	.60/.85
Chicago......	1.70	1.625	1.70	1.625	1.70	1.025	1.025
Cincinnati....	1.00/1.625	.70/1.35	1.40	1.00/1.40	1.00/1.625	.60/.75	.60/.75
Cleveland....	1.625	1.375	1.50	1.50	1.50	.90	.90
Dallas.......	1.50	1.25	1.25	1.00	1.50	.40	.40
Denver......	1.50*b*	1.50*b*	1.43*b*	....	1.43*b*	.714*b*	.714*b*
Detroit......	1.50	1.25	1.50	1.50	1.55	.60/.80	.60/.80
Kansas City..	1.625	1.375	1.50	1.50	1.575	.85	.45/.50
Los Angeles..	1.10	1.10	1.125	1.375	1.25	.625	.625
Minneapolis..	1.375	1.25*d*	1.50	1.40	1.50*e*	.85	.85
New Orleans..	1.00	1.00	1.25	1.00	1.00	.40	.40
New York ...	1.886*b*	1.75*b*	1.925	2.00*b*	2.00*c*	1.031	.875/.95
Philadelphia..	1.75	1.00	1.375	1.50	1.50	.50	.50
Pittsburgh...	1.75	1.50	1.50	1.25	1.75	.80	.70
St. Louis.....	1.50	1.25	1.75	1.57/1.75	1.58	.45/.875	.45/.875
San Francisco	1.75*c*	1.25*f*	1.50	1.50	1.65*c*	.81	.65
Seattle.......	1.60*c*	1.25*c*	1.50*c*	1.50*c*	1.60*c*	.90*c*	1.00*c*
Montreal....	.80	.70	.75	.60	.80	.40	.40

a PWA *b* 7 hr. day. *c* 6 hr. day. *d* 35 hr. wk. *e* 30 hr. wk.
Working under "stop-gap" agreement.

Building Trades Wage Rates Prevailing Feb. 15, 1938

Compiled by Public Works Administration from its records

	Mosaic and Terrazzo	Tile Layers	Stone Cutters	Stone Masons	Cement Finishers	Bricklayers	Masons' Helpers	Plasterers	Lathers	Building Labor	Carpenters	Electrical Workers	Elevator Constructors	Hoist Eng. 1 Drum	Hoist Eng. 2 Drum	Shovel Operator	Structural Ironworker	Rodmen	Painters	Glaziers	Plumbers	Steam Fitters	Sheet Metal Workers	Roofers	Water-proofers	[illegible]
Aberdeen, S. D.	1.20	1.20		1.20		1.20						1.00	1.10										1.00			
Albuquerque, N. M.	1.12	1.12		1.50	1.00	1.50	.60	1.50		.40	1.00	1.25	1.12	1.00	1.00	1.25	1.00	1.00	1.00		1.00		1.00			
Atlanta, Ga.	1.25	1.25	1.00	1.25	1.25	1.25	.40	1.25	1.00	.40	1.00	1.25	1.15	1.00	1.25	1.25	1.25	1.00	1.00	1.00	1.25	1.25	1.00	1.00	1.00	.50
Atlantic City, N. J.	1.39	1.37	1.50	1.50	1.25	1.50	.85	1.50	1.25	.62	1.25	1.50		2.00	2.00	2.00	1.75	1.75	1.00	1.00	1.25	1.25	1.25	1.25	1.25	.56
Augusta, Me.	1.00	1.00		1.00	.87	1.00	.60		1.20	.50	.87	.90	1.12	1.37	1.37	1.62			.80		1.00	1.00	.80			
Baltimore, Md	1.37	1.25	1.50	1.50	1.25	1.50	.75	1.25	1.25	.50	1.25	1.37	1.40	1.50	1.80	1.80	1.50	1.25	1.12	1.10	1.25	1.25	1.37	1.25	1.00	.60
Baton Rouge, La.	1.50	1.50		1.50	.80	1.50		1.25			.80	1.25	1.11						.80		1.00	1.00	.90			
Birmingham, Ala.	1.50	1.25	1.50	1.50	1.25	1.50	.50	1.25	1.25	.40	1.12	1.25	1.35	1.12	1.25	1.25	1.37	1.15	1.07	1.25	1.50	1.50	1.12	1.12	1.12	.60
Boston, Mass.		1.50	1.35	1.50	1.45	1.50	.85	1.67	1.67	.85	1.37	1.50	1.52	1.37	1.37	1.62	1.50	1.50	1.25	1.37	1.50	1.50	1.37	1.37	1.37	.75
Buffalo, N. Y.					1.12	1.25		1.33		.65			1.21				1.50	1.50			1.20		1.00			
Butte, Mont.					2.00		1.50	2.00	1.62	.80	1.50	1.50	1.54				1.50	1.50	1.37	1.37	2.00	2.00	1.50		.83	1.07
Camden, N. J.	1.37	1.50	1.50	1.50	1.25	1.62	1.07	1.65	1.50	.60	1.37	1.37	1.37	2.00	2.25	2.25	1.65	1.65	1.00	1.00	1.50	1.50	1.50	1.00	1.00	.80
Charleston, S. C.	1.00	1.00		1.00	1.00	1.00		1.00	1.00		.75	1.00	1.00				.75	.75	.75	.75	1.00	1.00	1.00	.75	.75	
Charleston, W. Va.	1.25	1.25	1.50	1.50	1.10	1.50	.62	1.37	1.25	.50	1.12	1.25			1.37	1.37	1.25	1.25	1.00	1.00	1.25	1.25	1.12	1.12	1.10	.65
Charlotte, N. C.						1.00		1.00	.50		.87	.90					1.25	1.00	.87		1.25	1.25	.90			
Cheyenne, Wyo.		1.37		1.37	1.25	1.37	.75	1.50	1.37	.55	1.12	1.20		1.00		1.25	1.12		1.12	1.12	1.25	1.25	1.00	1.00	1.00	.75
Chicago, Ill.	1.62	1.62	1.20	1.70	1.62	1.70	1.02	1.70	1.70	1.02	1.62	1.70	1.70	1.70	1.70	2.00	1.70	1.70	1.67	1.94	1.70	1.70	1.70	1.75	1.75	
Cincinnati, O.	1.25	1.25	1.62	1.62	1.37	1.62	1.00	1.62	1.40	.75	1.45	1.40		1.50	1.50	1.50	1.52	1.37	1.35	1.55	1.50	1.50	1.37	1.40	1.25	.80
Cleveland, O.	1.37	1.50		1.62		1.62		1.62	1.62	.90		1.65	1.60				1.62		1.50		1.50	1.50	1.37	1.42		
Columbia, S. C.	1.00	1.00	1.00	1.00	.75	1.00		.75	.75		.75	1.00	1.00				1.00	.75	.75	.75	1.12	1.12	.90	.90	.75	
Dallas, Tex.	1.50	1.50	1.50	1.50	1.25	1.50	.50	1.50	1.50	.50	1.00	1.25	1.42	1.12	1.25	1.25	1.25	1.00	1.00	1.00	1.50	1.50	1.37	1.00		
Davenport, Ia.	1.25	1.25	1.50	1.50	1.20	1.50	.60	1.50	1.50	.60	1.20	1.30	1.17	1.20	1.20	1.20	1.30	1.30	1.15	1.15	1.37	1.37	1.17	1.25	1.25	.70
Denver, Colo.			1.25	1.50	1.43	1.50	1.00	1.50	1.50	.71	1.53	1.43	1.44	1.43	1.43	1.50	1.43	1.43	1.25	1.20	1.43	1.43	1.43	1.35		1.00
Des Moines, Ia.		.90			1.25	1.50		1.37	1.43	.72		1.37	1.32	1.20			1.25		1.12		1.37	1.37	1.25			
Detroit, Mich	1.25	1.50	1.25	1.50	1.25	1.50	.70	1.55	1.50	.75		1.60	1.55	1.50	1.50	1.50	1.50	1.25	1.25	1.10	1.50	1.50	1.25	1.50	1.25	.75
Duluth, Minn.		1.25		1.25		1.25	.60	1.35	1.35	.60	1.12	1.12					1.25		1.00		1.25	1.25	1.10	1.00		
Evansville, Ind.	1.50	1.25	1.50	1.50	1.25	1.50	.65	1.50	1.25	.50	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	.90	.90	.65
Fargo, N. D.	1.20	1.35		1.35	1.00	1.35		1.20	1.00		.75	.87	1.19	1.40	1.40	1.50	1.50	1.50	.85		1.00	1.00	1.00			
Ft. Wayne, Ind.	1.30	1.30		1.50		1.50	.75	1.37		.60	1.10	1.20		1.00	1.25	1.40	1.37	1.37	1.15	1.15	1.25	1.25	1.00			
Grand Rapids, Mich.	1.25	1.25	1.50	1.50	1.25	1.50	.65	1.25	1.25		1.00	1.25	1.35	1.25	1.50	1.50	1.50	1.25	.90	1.25	1.00	1.00	1.00	.90	1.00	.60
Great Falls, Mont.	1.50	1.50		1.50	1.50	1.50	1.00	1.50		.80	1.50	1.00	1.54				1.25	1.12			1.12	1.12	1.25		1.00	
Green Bay, Wis.	1.25	1.25	1.25	1.25	1.25	1.25	.75	1.25	1.25	.65	1.00	1.00	1.25	1.00	1.25	1.25	1.37	1.25	.90	.90	1.20	1.20	1.00	.90	1.25	.75
Harrisburg, Pa.	1.37	1.25	1.25	1.25	1.25	1.25	.85	1.25	1.25	.70	1.00	1.06	1.70	1.50	1.50	1.50	1.50	1.25	.85	.85	1.12	1.12	1.00	1.00	1.00	
Hartford, Conn.	1.25	1.25		1.25	1.25	1.25	.75	1.25	1.25	.60	1.12	1.00	1.30	1.20	1.35		1.65	1.65	1.00	1.25	1.20	1.20	1.25	1.37		
Houston, Tex.	1.25	1.25		1.50	1.25	1.50		1.50	1.50	.40	1.12	1.50	1.42	1.12	1.37	1.37	1.37	1.12	1.12	1.12	1.50	1.50	1.50	.87	1.00	.40
Huntington, W. Va.					1.25	1.25		1.25	1.20	.40	1.00	1.00					1.25	1.25	1.00		1.12	1.12	1.12			
Indianapolis, Ind.	1.25	1.37	1.12	1.60	1.25	1.60	.95	.57	1.37		1.25	1.50	1.38	1.45	1.45	1.45	1.55	1.30	1.25	1.25	1.50	1.50	1.27	.75	.75	.75
Jackson, Miss.	1.25	1.25		1.50	1.25	1.50	.60	1.25	1.00	.40	1.00	1.00	1.20	1.00	1.25	.75	1.25	.60	.80	.80	1.25	1.25	1.00	.87	.87	.35
Jacksonville, Fla.	1.25	1.25		1.00	1.00	1.00	.40	1.00	1.00	.40	.75	1.25	1.05	1.00	1.00	1.00	1.25	1.00	.75	.75	1.25	1.25	1.00	.75		
Kansas City, Mo.	1.25	1.12	1.25	1.27	1.37	1.50	1.00	1.57	1.50	.85	1.37	1.37	1.42	1.37	1.50	1.50	1.50	1.32	1.25	1.50	1.50	1.50	1.50	1.25	1.37	.65
Knoxville, Tenn.	1.00		1.25	1.25	1.00	1.25		1.25	1.00	.40	1.00	1.10	1.10		1.25	1.25	1.37	1.25	.80	1.00	1.25	1.25	1.00	1.00	1.00	.75
Lexington, Ky.	1.50	1.25	1.50	1.25	1.00	1.25	.70	1.25	1.25	.50	.90	1.00	1.10	1.00	1.10	1.10	1.50	1.37	.90	.90	1.25	1.25	1.22	1.22		.50
Lincoln, Neb.	1.25	1.25		1.25		1.25		1.25	1.00	.60	.87	1.00	1.25	.90	.90	.95	1.20		.80	.80	1.25	1.25	1.10	.90		
Little Rock, Ark.	1.12	1.25		1.25	1.25	1.25		1.25	1.37		1.00	.87	1.12	1.12	1.12	1.25	1.00	1.00	.87		1.00	1.00	1.00			
Los Angeles, Cal.		1.25			1.25	1.25	.75	1.50	1.50	.62	1.10	1.12	1.25	1.12	1.12	1.50	1.37	1.25	1.05	1.10	1.25	1.25	1.12	1.00	1.00	1.00
Louisville, Ky.	1.25	1.25	1.00	1.50	1.25	1.50	.87	1.37	1.37	.50	1.25	1.25	1.35	1.25	1.10	1.25	1.50	1.32	1.00	1.00	1.37	1.37	1.00	1.00		.60
Manchester, N. H.				1.50	1.50	1.50	.80	1.50	1.25	.62	1.00	1.00					1.25	1.25	.90	.90	1.25	1.25	1.00			.60
Memphis, Tenn.	1.25	1.37		1.62	1.25	1.62	.62	1.56	1.37	.35	1.12	1.25	1.38	1.12	1.25	1.25	1.25	1.12	1.00	1.00	1.37	1.37	1.12	1.00	1.00	1.00
Miami, Fla.	1.50	1.62		1.50	1.50	1.50	.50	1.50	1.25		1.12	1.50	1.45	1.25	1.50	1.25	1.50	1.25	1.12	1.00	1.50	1.50	1.37	1.12		
Milwaukee, Wis.	1.30	1.25	1.25	1.45	1.30	1.45	.95	1.37	1.37	.85	1.20	1.30	1.37	1.35	1.35	1.50	1.37	1.25	1.12	1.10	1.32	1.35	1.20	1.00	1.00	1.25
Minneapolis, Minn.	1.37	1.32	1.25	1.37	1.25	1.37	.95	1.50	1.50	.85	1.25	1.25	1.37				1.50	1.25		1.10	1.50	1.50	1.25	1.20		.85
Mobile, Ala.	1.25	1.25	1.25	1.25	1.00	1.25		1.00			.90	.75	1.50	1.25	1.50	1.25	1.25	1.25		.75	1.25	1.25				
Montpelier, Vt.	1.25	1.25		1.25		1.25			1.45		.90	1.37	1.12	1.37	1.37	1.62					.80	.80	1.17			
Nashville, Tenn.	1.25	1.25		1.50	1.37	1.50	.50	1.37	1.25	.40	1.00	1.12	1.30			1.25	1.25	1.00	1.00	.75	1.25	1.25	1.00	.75	.75	.40
Newark, N. J.	1.53	1.69	1.69	1.81	1.81	1.81	1.12	1.81		1.12	1.75	1.75	1.75	2.00	2.00	2.00	2.00	2.00	1.25		1.50	1.65	1.65	1.51		
New Haven, Conn.	1.37	1.37		1.37	1.37	1.37	.65	1.37	1.50	.65	1.06	1.12	1.50	1.30	1.50	1.50	1.65	1.65	1.06	1.25	1.25	1.25	1.25			.75
New Orleans, La.	1.25	1.25	1.25	1.25	1.00	1.25	.60	1.25	1.25	.50	1.00	1.37	1.11	1.00	1.25	1.25	1.37	1.00	.75	.75	1.25	1.25	.90	.85	1.25	.50
New York, N. Y.	1.75	1.69	1.93	1.89	1.75	1.89	1.14	2.00	1.75	.95	1.75	2.00	1.75	2.00		2.12	1.92	1.75	1.50	1.89	2.00	1.75	1.75	1.60		1.00
Norfolk, Va.	1.25	1.25	1.25	1.25	1.10	1.25	.45	1.25	1.25	.45	.88	.90	1.25	1.10	1.10	1.10	1.25	.75	.82	.82	1.10	1.10	1.10	.75	.75	.65
Ogden, Utah	1.12	1.12	1.25	1.25	1.25	1.25	.90	1.50	1.12	.75	1.00	1.12	1.10	.85	1.00	1.25	1.50	.75	1.00	1.00	1.20	1.20	1.00	.85	.85	.90
Oklahoma, City, Okla.	25	1.00		1.50	1.50	1.50	.70	1.50	1.25	.50	1.25	1.12	1.35	1.25	1.25	1.25	1.25	1.25	1.00	1.00	1.25	1.25	1.25	1.00		.70
Omaha, Neb.	1.37	1.37	1.37	1.37	1.25	1.37	.50	1.25	1.25	.50	1.12	1.25	1.25				1.25	1.25	.90	1.05	1.25	1.25	1.00	.90	1.05	.60
Peoria, Ill.	1.05	1.25		1.62	1.37	1.62	.82	1.62	1.50	.82	1.37	1.37	1.42	1.37	1.50	1.50	1.37	1.37	1.12	1.25	1.37	1.37	1.37	1.25	1.25	1.00
Philadelphia, Pa.	1.55	1.40	1.50	1.50	1.25	1.62	.70	1.56	1.50	.60	1.25	1.37	1.47	1.50	1.50	1.50	1.65	1.25	1.12	1.25	1.44	1.44	1.25	1.00		.71
Phoenix, Ariz.	1.25	1.50	1.25	1.25	1.25	1.50	.75	1.50	1.25	.62	1.12	1.12	1.25	1.25	1.25	1.50	1.25	1.12	1.00	1.00	1.25	1.25	1.12	1.00	1.00	.75
Pittsburgh, Pa.	1.50	1.50	1.62	1.62	1.50	1.75	1.12	1.75	1.75	.80	1.50	1.50	1.65	1.50	1.56	1.56	1.50	1.50	1.37	1.40	1.50	1.67	1.50	1.37	1.37	.75
Pocatello, Ida.					1.37	1.50		1.50	1.12	.75	1.20	1.12					1.25		1.12	1.12	1.20	1.20	1.12			.85
Portland, Me.	1.25	1.25		1.25	1.25	1.25	.70	1.25		.50	.80	1.12		1.00	1.00	1.00	1.00	1.00	.75	.75	1.25	1.25	1.00	1.00	1.25	.50
Portland, Ore.	1.00	1.50	1.50	1.50	1.12	1.50	.75	1.50	1.37	.75	1.12	1.25	1.40	1.00	1.12	1.25	1.83	1.83	1.12	1.10	1.37	1.37	1.12	1.12	1.12	.85
Portsmouth, N. H.	1.50	1.50		1.50	1.50	1.50	.75	1.50	1.25	.55	.90	1.00	1.52	1.37	1.62	1.62	1.25	1.25	.85	.85	1.00	1.00	1.00	.75		
Providence, R. I.	1.50	1.50		1.50	1.15	1.50	.70	1.50	1.25	.60	1.00			1.50	1.50	1.75	1.50	1.50	1.00	1.00	1.35	1.37	1.15	1.10	1.50	
Raleigh, N. C.	1.10	1.10		1.10		1.10						1.00	1.00								1.00	1.00	1.00			
Reno, Nev.						1.75	1.17	1.75	1.50	.62	1.25	1.50	1.50				1.50	1.25	1.50	1.50	1.50	1.50	1.25			
Richmond, Va.	1.25	1.25	1.00	1.50	1.00	1.50		1.00		.40	.90	.95	1.25				1.25	1.00	.80	.75	1.00	1.00	1.00		.90	.40
Rochester, N. Y.	1.32	1.32	1.25	1.37	1.37	1.37	.65	1.37	1.37	.65	1.22	1.37	1.37	1.37	1.37	1.37	1.35	1.35	1.20	1.20	1.37	1.37	1.20	1.10	1.10	.65
Rock Island, Ill.	1.25	1.25	1.50	1.50	1.20	1.50	.60	1.50	1.50	.60	1.20	1.30	1.17	1.20	1.20	1.20	1.30	1.30	1.15	1.15	1.37	1.37	1.17	1.25	1.25	.70
Sacramento, Cal.	1.16	1.31		1.75	1.19	1.75	1.05	1.57	1.31	.75	1.19	1.37	1.40	1.31	1.31	1.50	1.50	1.25	1.19	1.10	1.50	1.50	1.31	1.19	1.19	.81
Saginaw, Mich.	1.25	1.50	1.50	1.50	1.25	1.50	.75	1.50	1.25	.65	1.00	1.20	1.28	1.25	1.50	1.25	1.25		1.00	1.00	1.20	1.20	.90	.80	1.25	.70
Salt Lake, Utah	1.20	1.20		1.37	1.10	1.37	.90	1.50	1.50	.65	1.12	1.12	1.25	1.25	1.25	1.25	1.25	1.12	1.00	1.00	1.20	1.20	1.10	.90	.90	1.00
San Antonio, Tex.		1.25		1.50		1.50	.50		1.25	.50	1.00	1.25	1.25	1.00	1.25	1.25	1.25	1.00	1.00		1.50	1.50	1.25	1.00		
San Francisco, Cal.	1.00	1.37	1.12		1.25	1.75	1.25	1.67	1.60	.75	1.25	1.37	1.50	1.37	1.37	1.62	1.50		1.21	1.21	1.37	1.37	1.25			1.12
Savannah, Ga.	1.00	1.00	1.00	1.00	.75	1.00	.30	1.00	1.00	.30	.90	1.00	1.00	1.00	1.25	1.00			.87		1.25	1.25				
Schenectady, N. Y.	1.45	1.25	1.45	1.45	1.45	1.45	.65	1.45	1.45	.65	1.20	1.35		1.37	1.37	1.37	1.37		1.00	1.00	1.35	1.35	1.37	1.37		.55
Seattle Wash.	1.35	1.35	1.60	1.60	1.25	1.60	1.15	1.60	1.50	.90	1.25	1.50	1.54	1.50	1.50	1.75	1.50	1.25	1.25	1.20	1.50	1.50	1.37	1.25		
Sioux City, Ia.	1.25	1.25		1.25	1.00	1.25	.65	1.25		.65	1.00	1.00	1.10				1.00	.90	1.00		1.00	1.00	1.00			
Sioux Falls, S. D.	1.20	1.37		1.37		1.37	.50	1.20			.90	1.00	1.10	1.40	1.40	1.50	1.00	1.00	.90		1.20	1.20	1.00		.75	
Spokane, Wash.	1.50			1.50	1.67	1.50	.80	1.67	1.50	.90	1.25	1.25	1.41	1.37		1.62	1.50	1.30	1.25	1.10	1.40	1.40	1.25	1.50		
Springfield, Ill.	1.62	1.50	1.62	1.62	1.25	1.62	.95	1.75	1.50	.80		1.40	1.35	1.35	1.50	1.50	1.50	1.50	1.25	1.25	1.50	1.50	1.40	1.15	1.15	.75
Springfield, Mass.	1.62	1.62		1.62	1.62	1.62	1.00	1.62	1.50		1.25	1.37	1.45	1.50			1.37		1.12	1.12	1.37	1.37	1.37	1.37	1.37	
St. Louis, Mo.	1.30	1.50	1.00	1.25	1.57	1.50	1.00	1.75	1.62	.87	1.50	1.50	1.58	1.50	2.00	2.00	1.75	1.75	1.50	1.50	1.62	1.62	1.50	1.37	1.37	.70
St. Paul, Minn.	1.25	1.32	1.37	1.37	1.25	1.37	.85	1.50	1.50	.75	1.25	1.35	1.19			1.50	1.50	1.50	1.20	1.00	1.25	1.20	1.25	1.10		
Syracuse, N. Y.	1.20	1.20	1.00	1.20	1.00	1.20		1.37	1.20		1.00	1.25	1.15				1.37	1.37	.90		1.25	1.25	1.00			
Toledo, O.	1.50	1.50	1.25	1.62	1.62	1.62	.80	1.62	1.62	.75	1.30	1.65	1.45	1.37	1.50	1.50	1.62	1.25	1.30	1.12	1.50	1.50	1.25	1.25	1.62	.65
Topeka, Kans.		1.25	1.12	1.12	1.25	1.37	.62	1.37	1.25	.50	1.00	1.00							1.00	1.00	1.25	1.25	1.00	1.00		.60
Tulsa, Okla.	1.50	1.50	1.50	1.50	1.50	1.50	.70	1.50	1.25	.50	1.25	1.37	1.35	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.50	1.50	1.37	.75	1.25	.70
Washington, D. C.	1.50	1.50	1.50	1.75	1.37	1.75	.65	2.00	1.62	.65	1.50	1.80	1.80	1.75	2.00	2.00	2.00	1.50	1.57	1.50	1.50	1.65	1.50	1.30	1.30	.85
Wheeling, W. Va.	1.25	1.25	1.50	1.50	1.25	1.50	.60	1.25	1.50		1.25	1.25	1.10	1.37	1.37		1.37	1.37			1.30	1.30	1.00			
Wichita, Kans.	.87	.87		.87	1.25	.87		1.25			1.00	1.00	1.36				1.10	.80			.90	.90	.87			
Wilmington, Del.	1.37	1.37	1.25	1.25	1.25	1.50	.50	1.37	1.25	.50	1.25	1.12		1.50	1.50	1.50	1.65	1.25	1.10	1.10	1.21	1.00	1.00	1.00	1.00	.62
Worcester, Mass.	1.50	1.50	1.50	1.50	1.50	1.50	.90	1.50	1.50	.65	1.17	1.25	1.30	1.57	1.57	1.57	1.50	1.50	1.00	1.00	1.20	1.20	1.37			.70

Yearly Average WAGES OF SIX BUILDING TRADES *in Seven Cities*

Bricklayers

	Boston	New York	Chicago	Birmingham	St. Louis	San Francisco	Seattle
1913	$0.65	$0.70	$0.75	$0.70	$0.70	$0.875	$0.75
1914	.65	.75	.75	.70	.75	.875	.75
1915	.65	.75	.75	.70	.75	.875	.75
1916	.65	.75	.75	.70	.75	.875	.75
1917	.70	.75	.75	.70	.75	.875	.81
1918	.80	.81	.75	.875	.85	1.00	1.00
1919	.80	.875	.875	.875	1.00	1.125	1.125
1920	1.00	1.25	1.25	1.00	1.25	1.25	1.25
1921	1.00	1.25	1.25	1.00	1.25	1.25	1.125
1922	1.00	1.25	1.10	1.00	1.25	1.25	1.125
1923	1.25	1.50	1.10	1.125	1.50	1.375	1.25
1924	1.25	1.50	1.35	1.125	1.75	1.25	1.25
1925	1.25	1.50	1.50	1.25	1.75	1.25	1.35
1926	1.35	1.645	1.56	1.25	1.75	1.25	1.375
1927	**1.40**	**1.75**	**1.625**	**1.25**	**1.75**	**1.375**	**1.375**
1928	**1.42**	**1.75**	**1.625**	**1.45**	**1.75**	**1.375**	**1.4275**
1929	**1.50**	**1.84**	**1.65**	**1.50**	**1.75**	**1.375**	**1.50**
1930	1.50	1.925	1.70	1.50	1.75	1.375	1.50
1931	1.50	1.7125	1.70	.8125	1.75	1.375	1.1875
1932	1.105	1.47	1.40	.825	1.50	1.175	.975
1933	**1.10**	**1.575**	**1.406**	**.812**	**1.50**	**1.125**	**1.01**
1934	1.12	1.53	1.50	1.00	1.50	1.50	1.30
1935	1.20	1.50	1.50	1.00	1.50	1.50	1.00
1936	1.28	1.50	1.50	1.00	1.50	1.50	1.00
1937	1.50	1.725	1.62	1.33	1.50	1.60	1.54

Hodcarriers

	Boston	New York	Chicago	Birmingham	St. Louis	San Francisco	Seattle
1913	$0.35	$0.375	$0.40	....	$0.4875	$0.50	....
1914	.35	.375	.40	....	.4875	.50	....
1915	.35	.375	.40	....	.4875	.50	....
1916	.35	.375	.425	....	.4875	.50	....
1917	.40	.425	.45	....	.4875	.50	....
1918	.425	.47	.50	....	.51	.625	....
1919	.50	.575	.575	....	.6375	.75	....
1920	.70	.775	1.00	....	.70	.93	....
1921	.70	.875	1.00	....	.85	1.00	$0.875
1922	.70	.875	.725	....	.85	.71	.875
1923	.70	.95	.725	....	1.00	.77	.93
1924	.82	1.00	.725	$0.385	1.20	.8125	.95
1925	.7625	1.00	.825	.6075	1.20	.8125	1.00
1926	.77	1.07	.88	.625	1.20	.8125	1.00
1927	.79	1.125	.925	.625	1.20	.875	1.00
1928	.805	1.125	.93125	.52	1.20	.875	1.00
1929	**.85**	**1.15**	.93	.50	**1.20**	.875	**1.00**
1930	.85	1.03⅛	.975	.50	1.20	.875	1.00
1931	.85	1.025	.975	.35	.875	.875	.70
1932	.70	1.00	.825	.40	1.00	.70	.80
1933	.70	.91	....	....	1.00	.70	.80
1934	.70	.825	.825	....	.875	.70	1.00
1935	.70	.825	.825	....	.875	.70	1.00
1936	.77	.825	.95	.30–.40	.875	1.00	1.00
1937	.85	1.14	1.025	.40	1.00	1.10	1.15

Carpenters

	Boston	New York	Chicago	Birmingham	St. Louis	San Francisco	Seattle
1913	$0.50	$0.625	$0.65	$0.525	$0.625	$0.625	$0.56
1914	.55	.625	.65	.45	.625	.625	.56
1915	.55	.625	.65	.45	.625	.625	.56
1916	.57	.625	.70	.45	.625	.625	.56
1917	.60	.69	.70	.45	.65	.68	.65
1918	.65	.69	.70	.55	.70	.75	.825
1919	.75	.75	.80	.65	.825	.875	.93
1920	1.00	1.125	1.25	.75	1.00	1.06	1.00
1921	1.00	1.125	1.25	.75	1.25	1.125	.875
1922	1.00	1.125	1.10	.75	1.10	1.04	.875
1923	1.05	1.125	1.25	.75	1.25	1.04	1.00
1924	1.05	1.3125	1.17	.76	1.525	1.00	1.00
1925	1.0875	1.3125	1.3475	.6025	1.50	1.00	1.0825
1926	1.20	1.45	1.39	.6575	1.50	1.00	1.125
1927	**1.25**	**1.50**	**1.30**	.95	1.50	1.125	1.125
1928	**1.279**	**1.50**	**1.50**	**1.00**	**1.50**	**1.125**	**1.125**
1929	**1.38**	**1.55**	**1.47**	**1.00**	**1.50**	**1.125**	**1.125**
1930	1.375	1.65	1.625	1.00	1.50	1.125	1.125
1931	1.175	1.45	1.625	.60	1.50	1.125	.875
1932	1.04	1.33	1.40	.60	1.275	.96	.695
1933	**1.065**	**1.375**	**1.3125**	**.60**	**1.25**	**.90**	**.73**
1934	.9375	1.40	1.3125	1.00	1.25	1.05	.83
1935	.9275	1.40	1.3156	1.00	1.25	1.10	1.00
1936	.937	1.40	1.50	.88	1.25	1.12	1.00
1937	1.14	1.60	1.57	1.06	1.35	1.31	1.23

Plasterers

	Boston	New York	Chicago	Birmingham	St. Louis	San Francisco	Seattle
1913	$0.65	$0.69	$0.75	....	$0.75	$0.875	$0.75
1914	.65	.69	.75	....	.75	.875	.75
1915	.65	.69	.75	....	.75	.875	.75
1916	.70	.75	.75	....	.75	.875	.75
1917	.70	.75	.75	....	.75	.875	.875
1918	.70	.75	.81	....	.875	1.00	1.00
1919	.80	.90	.875	....	1.00	1.125	1.125
1920	1.00	1.25	1.25	....	1.25	1.25	1.25
1921	1.25	1.25	1.25	....	1.375	1.375	1.25
1922	1.125	1.25	1.10	....	1.375	1.275	1.125
1923	1.125	1.25	1.50	....	1.50	1.275	1.25
1924	1.25	1.50	1.50	....	1.75	1.275	1.375
1925	1.25	1.50	1.50	....	1.75	1.50	1.375
1926	1.50	1.75	1.50	....	1.75	1.50	1.375
1927	1.50	1.75	1.625	....	1.75	1.50	1.375
1928	1.50	1.75	1.625	....	1.75	1.50	1.50
1929	1.50	1.75	1.625	....	1.75	1.375	1.50
1930	1.625	1.925	1.70	....	1.75	1.375	1.50
1931	1.50	1.7125	1.70	$1.00	1.75	1.375	1.1875
1932	1.625	1.50	1.375	1.25	1.50	1.10	1.20
1933	**1.375**	**1.50**	**1.375**	....	**1.50**	**1.10**	**1.20**
1934	1.231	1.50	1.50	1.00	1.50	1.38	1.18
1935	1.375	1.50	1.50	1.00	1.50	1.25	1.375
1936	1.375	1.50	1.50	1.00	1.50	1.35	1.25
1937	1.625	1.80	1.62	1.00	1.51	1.51	1.54

Structural Ironworkers

	Boston	New York	Chicago	Birmingham	St. Louis	San Francisco	Seattle
1913	$0.625	$0.625	$0.68	$0.625	$0.65	$0.75	$0.625
1914	.625	.625	.68	.625	.65	.75	.625
1915	.625	.625	.68	.625	.65	.75	.625
1916	.625	.66	.68	.625	.675	.75	.625
1917	.68	.68	.69	.625	.70	.75	.75
1918	.80	.80	.70	.75	.80	.875	.875
1919	.80	.875	.875	.80	.925	1.00	1.00
1920	1.00	1.125	1.25	1.00	1.25	1.125	1.125
1921	1.00	1.125	1.25	......	1.25	1.25	1.125
1922	1.00	1.125	1.05	......	1.06	1.125	1.00
1923	1.05	1.125	1.05	1.05	1.25	1.125	1.125
1924	1.16	1.29	1.25	1.00	1.45	1.125	1.125
1925	1.1375	1.4675	1.36	1.135	1.50	1.125	1.125
1926	1.23	1.60	1.405	1.25	1.50	1.125	1.125
1927	1.25	1.75	1.50	1.55	1.50	1.375	1.155
1928	1.3125	1.75	1.50	1.75	1.50	1.375	1.215
1929	**1.375**	**1.81**	**1.57**	**1.63**	**1.57**	**1.375**	**1.25**
1930	1.375	1.925	1.625	1.25	1.75	1.375	1.25
1931	1.375	1.925	1.625	.75	1.75	1.375	1.1875
1932	1.205	1.675	1.375	.75	1.50	1.13	1.13
1933	**1.14**	**1.65**	1.35	.75	**1.47**	**1.20**	**1.10**
1934	1.20	1.62	1.35	1.00	1.47	1.375	1.13
1935	1.20	1.65	1.35	1.125	1.47	1.375	1.23
1936	1.20	1.58	1.50	1.10	1.47	1.375	1.25
1937	1.375	1.79	1.58	1.25	1.73	1.44	1.39

Common Laborers

	Boston	New York	Chicago	Birmingham	St. Louis	San Francisco	Seattle
1913	$0.35	$0.225	$0.40	......	$0.25	$0.27	$0.375
1914	.35	.225	.40	......	.25	.31	.375
1915	.35	.25	.40	......	.25	.31	.375
1916	.35	.25	.425	......	.25	.31	.375
1917	.375	.30	.45	......	.30	.375	.4375
1918	.40	.405	.50	......	.365	.43	.56
1919	.40	.405	.575	......	.425	.625	.6875
1920	.6875	.75	1.00	......	.6075	.75	.75
1921	.6875	.60	1.00	......	.6075	.81	.75
1922	.6875	.60	.725	......	.5575	.625	.625
1923	.6875	.615	.725	......	.6075	.625	.625
1924	.6625	.6875	.8175	$0.335	.70	.525	.625
1925	.6025	.6525	.8175	.31	.6525	.525	.5625
1926	.615	.815	.86	.30	.6525	.525	.5675
1927	.595	.90625	.8875	.325	.5875	.55	.64
1928	.6025	.90625	.90	.325	.60	.55	.678
1929	**.625**	**.985**	**.92**	.29	**.61**	**.57**	**.70**
1930	.625	**1.03125**	.975	.275	.6375	.6875	.70
1931	.60	.65625	.7375	.20	.6125	.59⅜	.60
1932	.575	.645	.665	.225	.56	.56	**.485**
1933	**.548**	**.725**	**.784**	**.248**	**.6223**	**.64**	**.48**
1934	.55	.8475	.825	.30	.7875	.64	.53
1935	.575	.68	.825	.30	.7875	.625	.60
1936	.581	.65	.95	.35	.7875	.651	.60
1937	.725	.91	.99	.35	.86	.75	.87

Equipment Costs and Rentals

The cost of owning and operating equipment becomes more and more a factor in the cost of construction as operations are increasingly mechanized. Equipment costs are higher than is generally realized. For example, few people outside of equipment users realize that it costs more than $1,000 per month to own a 1½-yd. diesel shovel, exclusive of operating costs, or that the monthly rental on a large portable compressor is $350.

The two accompanying tables are presented to indicate the current value of construction equipment costs. One gives a few items from the manual "Contractors' Equipment Ownership Expense," compiled and copyrighted by the Associated General Contractors of America, Munsey Bldg., Washington, D. C. This material is used with the special permission of the copyright owners. The other is a selected list of minimum rental prices of equipment prevailing in the Upper Ohio Valley.

In compiling the ownership expense manual, the A.G.C. has assigned average annual expense charges, rated in per cent of capital investment, to three main items: depreciation; overhaul and major repairs; and interest, taxes, storage and insurance. The sum of these three gives the annual total expense. From an average period of use per year, the capital expense per working month for each piece of equipment is obtained, and this rate, applied to the purchase cost to the owner, gives the actual cost per working month. The expense figures, which are only averages, are not to be considered as rental prices for there are additional charges justified when renting out equipment.

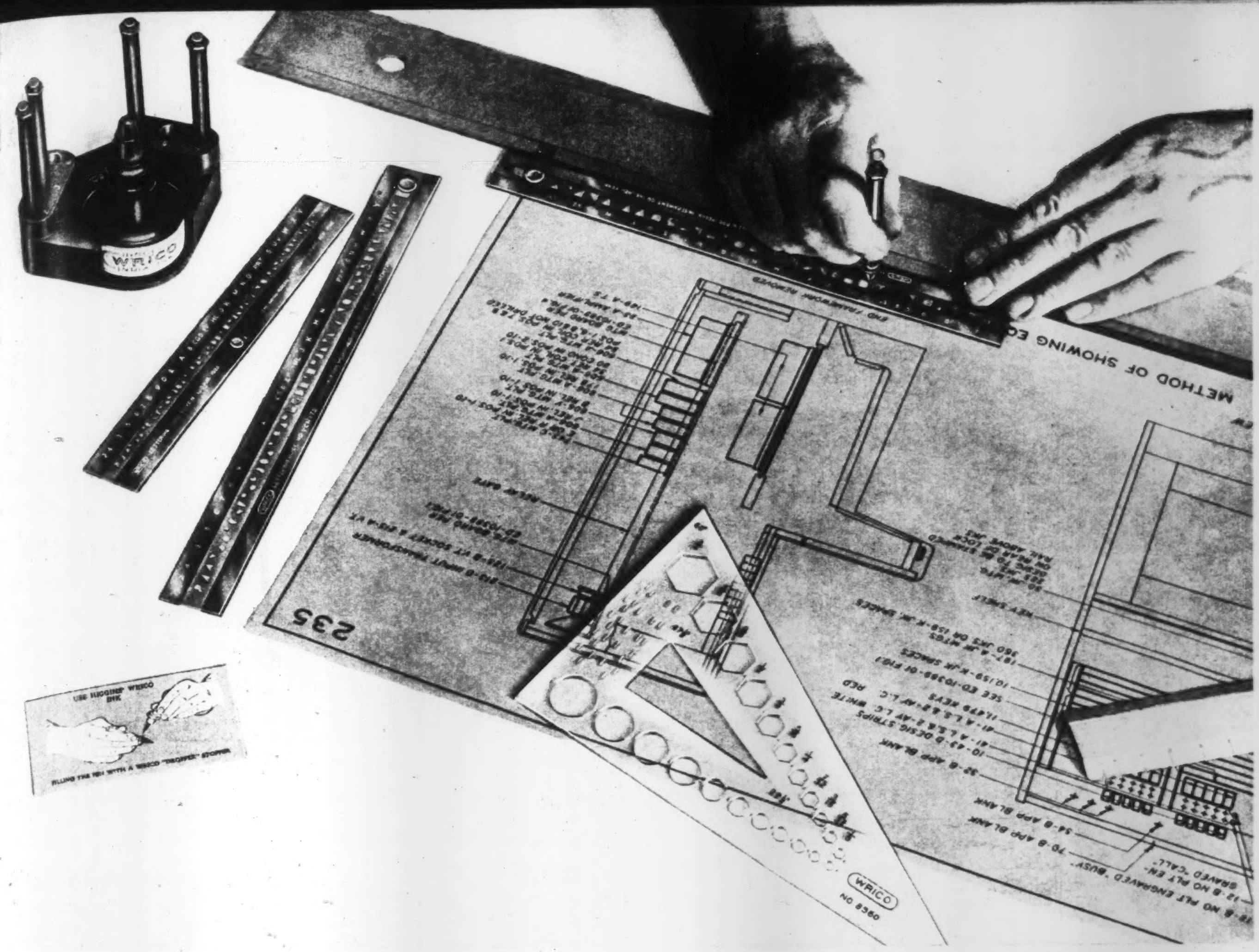
A. G. C. Schedule of Equipment Ownership Expense

EQUIPMENT	Av. Annual Expense in Per Cent of Capital Investment — Without Fuel, Operator or Field Repairs				Av. Months Used per Year	Exp. per Work Month. Per Cent	Schedule Applied to Selected Prices	
	Depr.	Overhaul, Major Rep.	Interest, Taxes, Storage, Ins.	Total Exp.			Price	Exp. per Work Month
Bit. distributor, truck, 1,000 gal.	20	17	11	48	6	8 0	$4,200	$335
Bit. traveling plant, 2 c.y. per min.	20	17	11	48	6	8 0	17,000	1,360
Bucket, clamshall digging, 1½ c.y.	20	18	11	49	6	8 2	1,200	100
Bucket, bottom-dump, concrete, 1 c.y.	20	15	11	46	6	7 7	250	19
Compressor, port. gas, 315 c.f.	20	15	11	46	6	7.7	4,500	345
Derrick, steel stiffieg, 15 ton, 70 ft. boom.	8	15	11	34	7	4 9	4,200	205
Dragline, diesel, 2 c.y., 50 ft. boom	17	15	11	43	7	6 1	2,500	1,525
Elev. tower, tub. 100 ft. dbl. cage	20	8	11	39	8	4 9	1,450	70
Finishing mach., std. gas, 10–21 ft.	25	15	11	51	6	8 5	3,350	285
Grader, motor dual-dr. diesel	20	15	11	46	8	5 7	5,000	285
Hoist, 2 drum elec., 60 hp.	13	10	11	34	8	4 2	2,850	120
Locomotive, 10 ton gas	17	12	11	40	8	5 0	5,000	250
Mixer, concrete, 14-S gas	33	12	11	56	8	7 0	2,100	145
Mixer, paver, 27-E gas	25	15	11	51	6	8 5	9,200	780
Mixer, truck, 3 c.y.	25	16	11	52	8	6 5	5,500	355
Pile hammer, dbl.-acting, 8,000 ft.-lb.	20	12	11	43	6	7 2	1,800	129
Pump, cent. port. gas, 2-in.	20	18	11	49	6	8 2	255	20
Pump, high-pressure road, 125 g.p.m.	25	20	11	56	6	9 3	1,750	165
Rock dril , med. drifter	25	10	11	46	6	7 7	385	30
Rock drill, med. jack hammer	33	10	11	54	6	9 0	190	17
Road roller, 3 wheel gas, 10 ton	14	12	11	37	8	4 6	4,100	190
Scraper, carrying, 10 c.y.	20	15	11	46	8	5 7	4,500	255
Shovel, diesel crawler, 1½ c.y.	18	15	11	44	8 5	5 2	20,000	1,040
Tractor, diesel, 95 hp	20	15	11	46	8	5 8	7,500	435
Truck, heavy duty dump, 5 c.y.	20	12	11	43	8	5 4	6,500	350

Equipment Rental Prices Upper Ohio Valley

Item	Price per Month*
Backfiller	$250.00
Bins:	
Two comp., 50 ton	150.00
Two comp., 100 ton	180.00
Boilers, 40 hp	75.00
Buckets:	
Conc. contr. dump, 1 yd	35.00
Conc. contr. dump, 2 yd	50.00
Conc. tipover type, 1 yd	20.00
Clamshell, ¾ yd	90.00
Clamshell, 1 yd	115.00
Clamshell, 1½ yd	150.00
Dragline, 1 yd	115.00
Dragline, 1½ yd	150.00
Dragline, 2 yd	175.00
Orange peel, 1 yd	150.00
Cars, dump:	
4 yd	25.00
6 yd	45.00
12 yd	50.00
20 yd	75.00
30 yd	110.00
Chain falls, 5 ton	25.00
Compressors:	
Port. gas, 160 ft	200.00
Port. gas, 210 ft	250.00
Port. gas, 360 ft	350 00
Sta. 20x12, 100 hp., no power	150.00
Chutes, conc. 30 ft	10.00
Column clamps:	
36 in	.25
60 in	.35
Conveyor, belt:	
Gas or elec., 16 in., 32 ft	100.00
Gas or elec., 24 in., 32 ft	125.00
Cranes:	
Gas crawler, ¾ yd	450.00
Gas crawler, 1 yd	550.00
Gas crawler, 1½ yd	650.00
Locomotive, 20 ton	500.00
Derricks, steel:	
Stiffleg, 5 ton, 50 ft. bm	100.00
Stiffleg, 10 ton, 70 ft. bm	150.00
Guy, 5 ton, 50 ft. bm	100.00
Guy, 20 ton, 80 ft. bm	225.00
Drills, pneu. rock:	
Jackhammer	30.00
Wagon drills	125.00
Engines, gas:	
5 hp	20.00
15 hp	40.00
60 hp	80.00
Graders, road:	
Drawn, lean. wheel, 6,500 lb	135.00
Drawn, lean. wh., 11,000 lb., pow. contr.	250.00
Motor patrol, up to 12,500 lb	250.00
Motor patrol, over 12,500 lb	325.00
Hoists:	
Elec., 2 drum, 20 hp	65.00
Elec., 2 drum, 40 hp	90.00
Elec., 2 drum, 60 hp	115.00
Elec., 2 drum, 100 hp	150.00
Gas, single drum, 20 hp	55.00
Gas, single drum, 40 hp	80.00
Gas, single drum, 60 hp	135.00
Lighting units:	
Gas-elec., 2½ kw	50.00
Carbic	10.00
Locomotives:	
Gas or diesel, 6–8 ton	200.00
Gas or diesel, 10 ton	250.00
Gas or diesel, 12 ton	300.00
Gas or diesel, 15–18 ton	450.00
Gas or diesel, 20 ton	600.00
Gas or diesel, 25 ton	750.00
Steam, 13x18, 14x20	400.00
Steam, 16x24, 18x24	500.00
Mixers, concrete:	
Power loader, 7-S	85.00
Power loader, 14-S	135.00
Power loader, 21-S	165.00
Batch hopper, 28-S	195.00
Batch hopper, 56-S	350.00
Paver, 27-E	750.00
Pile hammers:	
Union #6, McKiernan-Terry #2	60.00
Union #4, McK-T #5	90.00
Union #2, McK-T #7	125.00
Vulcan #1	150.00
Union #1, McK-T #9B2, Vulcan #0	200.00
Union #00, McK-T #11B2	275.00
Piledriver hanging leads, steel 50 ft	35.00
Pumps:	
Steam, 4 in., 1,150 gpm	85.00
Steam, 8 in., 2,000 gpm	125.00
Gas or elec., pressure, 30 gpm	45.00
Gas or elec., pressure, 40 gpm	65.00
Triplex, 100 gpm	150.00
Gas centrifugal, 2 in	40.00
Gas centrifugal, 3 in	50.00
Gas centrifugal, 4 in	75.00
Elec. centrifugal, 6 in	115.00
Hand diaphragm, 4 in	12.50
Power diaphragm, 4 in	40.00
Road finishing machines:	
9–20 ft	275.00
24–30 ft	350.00
Road forms:	
8–9 in., per ft	.10
10 in., per ft	.125
Road rollers:	
Gas, 3 wheel, 10 ton	200.00
Gas, 3 wheel, 12–15 ton	250.00
Gas, tandem, 5 ton	150.00
Gas, tandem, 8 ton	175.00
Gas, tandem, 10 ton	200.00
Road subgraders:	
9–12 ft	50.00
15–20 ft	75.00
24–30 ft	150.00
Saws:	
Table, 8 hp. eng., two saws	50.00
Elec. hand, 8 in	30.00
Scrapers:	
Rollover, 27 c.f	40.00
Rollover, 56 c.f	75.00
Shores, each	.25
Shovels, gas crawler:	
½ yd	450.00
¾ yd	550.00
1 yd	650.00
1¼ yd	700.00
1½ yd	750.00
Tractors:	
30 hp., bare	200.00
30 hp., bulldozer	275.00
50 hp., bare	325.00
50 hp., bulldozer	425.00
75 hp., bare	450.00
75 hp., bulldozer	600.00
Trench brace, doz	6.00
Trenching machine	300.00
Wagons, crawler dump, 5-8 yd	125.00
Welding machines:	
200 amp	125.00
300 amp	150.00

* Note: Prices are generally minimums; some items subject to discount for rental periods over one month; prices are for one shift 10 hr. or less per day, add 70 per cent for each additional shift.



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Classification of work	Ala.	Ariz.	**Ark.**	Cal.	Colo.	Conn.	Del.	D. C.	Fla.	Ga.	Idaho	Ill.	Ind.	Ia.	Kans.	Ky.	La.	Me.	Md.	Mass.	Mich.	Minn.	**Miss.**	Mo.
1 Wrecking Buildings or Demolition	19.56	35.22	**22.80**	29.75	29.40	29.65	12.50	29.59	22.72	24.39	30.21	36.50	19.95	17.89	24.95	23.04	26.75	29.19	26.02	24.79	34.14	28.07	**23.44**	44.42
2 Blasting	G	G	**G**	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	**G**	G
3 Excavation, earth or common (1)	3.44	7.76	**5.21**	8.93	6.04	6.25	3.00	6.08	3.72	4.28	7.19	6.14	3.94	3.54	4.62	3.58	5.33	4.84	4.56	6.67	6.06	6.91	**5.34**	10.22
4 Excavation, rock (1)	5.47	11.98	**12.16**	13.37	7.17	8.77	3.00	10.46	5.55	7.31	8.29	8.38	5.35	4.31	6.03	7.19	N.A.	8.18	7.84	11.05	9.51	10.04	**9.93**	14.05
5 Concrete Work, engineering structures (2)	6.80	14.26	**19.95**	10.62	10.11	10.03	4.00	13.40	8.04	8.70	12.38	7.67	8.62	6.96	7.60	7.89	10.96	10.36	8.34	14.94	10.59	11.43	**15.87**	15.93
6 Concrete Work, buildings not over 3 stories	2.15	6.36	**6.57**	5.35	3.67	5.98	4.00	5.66	2.61	2.71	4.77	4.39	3.31	2.03	2.99	2.47	3.87	5.10	6.71	8.59	4.08	1.75	**6.83**	5.87
7 Concrete Work, buildings over 3 stories	4.36	8.43	**9.30**	6.14	5.69	7.61	4.00	6.57	4.86	4.50	7.94	7.59	3.87	3.86	6.50	5.89	6.82	6.46	7.46	7.11	7.21	9.43	**9.71**	9.91
8 Concrete Work, reinforced floors	4.36	8.43	**9.30**	6.14	5.69	7.61	4.00	6.57	4.86	4.50	7.94	7.59	3.87	3.86	6.50	5.89	6.82	6.46	7.46	7.11	7.21	9.43	**9.71**	9.91
9 Concrete Work, pavement	3.07	7.76	**12.16**	7.01	6.96	5.58	4.00	6.33	3.60	4.62	6.62	6.31	3.59	3.52	5.59	4.83	4.62	4.26	3.44	6.19	4.22	6.11	**7.75**	N.A.
10 Carpentry, concrete form construction	4.39	9.16	**9.04**	7.26	6.56	6.20	1.80	6.39	4.14	7.27	7.92	9.15	5.87	3.32	5.25	5.11	7.99	7.60	6.76	9.73	5.80	5.45	**11.50**	6.17
11 Carpentry, buildings 3 stories or under	2.37	4.09	**3.17**	7.26	4.53	3.66	1.80	4.14	N.A.	3.03	4.81	5.12	3.10	3.32	3.45	2.97	5.36	3.23	3.33	3.77	5.80	5.45	**2.86**	6.17
12 Carpentry, buildings over 3 stories	4.39	9.16	**9.04**	7.26	6.56	6.20	1.80	6.39	4.14	7.27	7.92	9.15	5.87	3.32	5.25	5.11	7.99	7.60	6.76	9.73	5.80	5.45	**11.50**	6.17
13 Carpentry, interior trim buildings	1.06	N.A.	**1.98**	7.26	2.03	2.19	1.80	2.34	1.60	1.32	2.46	1.57	1.51	1.31	1.76	1.22	2.18	1.55	1.89	2.34	1.67	5.45	**1.99**	6.17
14 Structural Iron and Steel erection	10.96	33.67	**30.61**	23.29	19.83	19.12	7.00	20.13	14.93	14.78	21.84	13.97	15.16	10.35	15.82	13.48	14.82	16.61	18.55	24.88	19.76	20.20	**32.39**	33.66
15 Ornamental Iron erection	2.04	4.43	**7.00**	5.45	3.90	4.03	7.00	4.40	2.99	2.68	4.46	3.13	2.92	2.34	3.32	2.55	4.08	3.05	3.64	4.73	3.47	3.76	**7.35**	5.16
16 Roofing	5.96	N.A.	**7.49**	14.30	8.65	7.96	N.A.	9.08	9.12	8.19	10.25	8.73	8.51	5.41	7.38	6.89	8.87	8.75	7.41	12.06	9.64	11.70	**8.42**	13.62
17 Waterproofing	2.42	5.63	**3.19**	4.31	4.02	4.29	N.A.	4.63	3.12	3.08	N.A.	3.74	3.00	2.57	3.52	2.91	4.40	3.60	3.75	4.89	3.98	4.52	**3.33**	6.01
18 Lathing and Plastering	1.91	4.06	**2.44**	5.35	2.70	2.86	1.20	3.07	2.10	2.47	3.17	3.66	2.03	1.69	2.33	2.32	2.89	2.84	2.54	3.61	3.14	3.70	**2.46**	4.62
19 Bricklaying	2.15	6.36	**6.57**	5.35	3.67	5.98	4.00	5.66	2.61	2.71	4.77	4.39	3.31	2.03	2.99	2.47	3.87	5.10	6.71	8.59	4.08	1.75	**6.83**	5.87
20 Sheet metal work	2.23	5.66	**5.99**	12.87	3.34	3.39	1.45	3.27	2.62	2.82	3.96	3.10	3.05	2.07	2.81	2.63	3.42	3.23	3.09	2.58	3.62	3.65	**6.25**	4.55
21 Plumbing, heating, gas fitting	1.44	2.73	**2.38**	2.67	2.32	2.43	.95	2.66	2.13	1.74	2.77	2.04	2.17	1.56	1.94	1.66	2.59	2.08	2.27	2.24	2.36	3.34	**2.94**	3.11
22 Glazing	3.53	6.29	**3.86**	6.17	5.48	5.80	N.A.	6.25	4.30	4.39	6.57	4.78	4.11	3.47	4.71	4.08	5.78	5.18	5.01	3.67	5.50	6.30	**3.71**	7.75
23 Electrical Wiring, installing	1.26	2.68	**2.38**	3.02	2.00	2.20	1.15	2.41	1.86	1.60	2.44	1.86	1.61	1.30	1.69	1.43	2.21	1.81	1.78	1.84	2.03	2.26	**2.40**	2.81
24 Electrical Equipment, installing	2.04	4.59	**5.61**	3.71	3.18	3.35	1.15	3.44	3.08	2.63	3.67	3.22	2.31	1.97	3.46	2.37	3.53	2.95	2.66	4.17	3.29	3.58	**5.09**	5.27
25 Painting, struct. steel in field, eng. struct	10.96	33.67	**30.61**	23.29	19.83	19.12	7.00	20.13	14.93	14.78	21.84	13.97	15.16	10.35	15.82	13.48	14.82	16.61	18.55	24.88	19.76	20.20	**32.39**	33.66
26 Painting, buildings	2.26	4.54	**3.98**	6.12	4.15	4.05	1.55	4.55	3.11	3.00	4.84	3.64	3.74	3.60	3.50	2.69	4.59	3.40	3.77	N.A.	5.01	4.68	**3.21**	3.99
27 Watchmen and time keepers	1.85	6.36	**6.57**	G	2.61	2.78	G	2.99	2.07	2.31	3.11	2.73	1.96	1.64	2.25	2.16	2.73	2.70	2.44	3.14	2.93	3.30	**5.41**	4.37
28 Officers and superintendents, supervising	.39	.88	**.90**	.69	.57	.57	G	.64	.41	.54	.61	.58	.43	.30	.46	.46	.53	.57	.57	.65	.65	.70	**.93**	.94
29 Office workers	.07	.10	**.09**	.08	.11	.10	.05	.11	.08	.07	.09	.07	.07	.07	.07	.06	.10	.09	.13	.07	.07	.08	**.08**	.07

Classification of work	Mont.	Neb.	Nev.[3]	N. H.	N. J.	N. M.	N. Y.	N. C.	N. D.[3]	Ohio[3]
1 Wrecking Buildings or Demolition	37.52	36.94	.....	18.97	30.20	23.69	N.A.	26.11	NORTH DAKOTA STATE PLAN: Workmen's Compensation Bureau, Bismark, N. D. "Manual of Rules and Rates" effective July 1, 1937. Rates include: initial rating, basic or preferred rate defined as printed manual rate, experience rating. For basic rates and credit merit rating system see manual.	OHIO STATE PLAN: Workmen's Compensation. The Industrial Commission of Ohio, Actuarial Section, Columbus, O. "The Ohio State Insurance Manual, Workmen's Compensation Premium Rules and Rates" effective July 1, 1937. Basic rates, initial rating, experience rating shown. Also formulas for computing loss experience and experience modification of basic rate.
2 Blasting	G	G	.....	G	G	G	G	G		
3 Excavation, earth or common (1)	7.64	7.13	.....	3.19	7.40	4.83	11.22	4.13		
4 Excavation, rock (1)	9.20	N.A.	.....	4.58	10.10	5.75	D13.58	9.17		
5 Concrete Work, engineering structures (2)	13.40	15.82	.....	6.75	10.80	8.41	18.64	8.82		
6 Concrete Work, buildings not over 3 stories	5.18	4.15	.....	3.50	7.10	3.31	R10.87	3.00		
7 Concrete Work, buildings over 3 stories	8.35	9.75	.....	4.63	8.30	5.31	11.95	6.02		
8 Concrete Work, reinforced floors	8.35	9.75	.....	4.63	8.30	5.31	11.95	6.02		
9 Concrete Work, pavement	7.40	4.47	.....	4.19	4.10	3.03	8.80	5.18		
10 Carpentry, concrete form construction	8.54	7.31	.....	4.34	6.50	5.05	9.28	5.23		
11 Carpentry, buildings 3 stories or under	5.14	5.29	.....	2.63	4.90	3.27	N.A.	3.37		
12 Carpentry, buildings over 3 stories	8.54	7.31	.....	4.34	6.50	5.05	9.28	5.23		
13 Carpentry, interior trim buildings	2.52	2.55	.....	1.35	A	1.63	N.A.	1.32		
14 Structural Iron and Steel erection	25.88	24.95	.....	12.52	22.70	16.17	50.00	15.52		
15 Ornamental Iron erection	4.95	4.91	.....	2.52	6.30	3.16	7.02	2.76		
16 Roofing	10.99	10.86	.....	5.62	10.10	6.94	N.A.	7.86		
17 Waterproofing	5.00	5.10	.....	2.68	5.80	3.24	8.57	3.11		
18 Lathing and Plastering	3.37	3.40	.....	1.78	4.20	2.19	6.47	2.48		
19 Bricklaying	5.18	4.15	.....	3.50	7.10	3.31	R10.87	3.00		
20 Sheet metal work	4.24	4.17	.....	2.14	P4.50	2.67	8.80	2.83		
21 Plumbing, heating, gas fitting	2.85	2.89	.....	1.47	3.10	1.80	4.59	1.87		
22 Glazing	6.89	6.87	.....	3.58	6.60	4.38	13.99	4.35		
23 Electrical Wiring, installing	2.52	2.49	.....	1.29	2.30	1.58	3.41	1.59		
24 Electrical Equipment, installing	3.86	3.75	.....	1.98	3.70	2.43	4.97	2.48		
25 Painting, struct. steel infield, eng. struct.	25.88	24.95	.....	12.52	22.70	16.17	A	15.52		
26 Painting, buildings	5.35	4.55		2.68	6.20	3.42	9.98	2.92		
27 Watchmen and time keepers	3.34	3.31		1.71	"A"	2.11	7.38	2.32		
28 Officers and superintendents, supervising	.72	.68		.35	.79	.46	1.24	.54		
29 Office workers	.09	.08		.06	.09	.07	.09	.07		

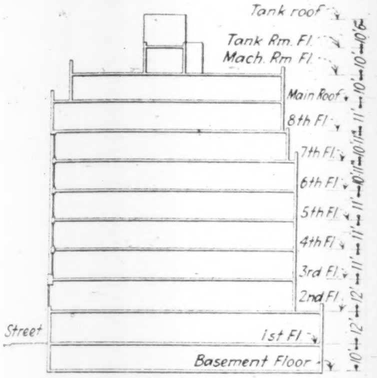
Classification of work	Okla.	Ore.[3]	Penna.	R. I.	S. C.	S. D.	Tenn.	Tex.	Utah	Vt.	Va.	Wash.[3]	W. Va.[3]	Wisc.	Wyo.[3]
1 Wrecking Buildings or Demolition	47.40	28.04	40.00	41.04	34.39	19.30	21.27	27.12	58.02	16.23	19.17	20.84	WEST VIRGINIA STATE PLAN: State Compensation Commission, Charleston, W. Va., schedule of premium rates effective July 1, 1937. Base rate and merit rate. Merit rate sum of loss ratio and loading of 20% of base rate. Minimum rate 65% and maximum 200% of base rate.	34.00	WYOMING STATE PLAN: Manager, Workmen's Compensation Dept., State Treasurer's Office, Cheyenne, Wyo. April, 1938, no change in the rates that became effective Mar. 1, 1937. Initial rate 6% on first 12 monthly reports then drops to 2% and continues thus thereafter unless overdraft occurs. Plan provides for refundable administration fees, penalties, exemptions when credit balance is favorable.
2 Blasting	G	G	G	G	G	G	G	G	G	G	G	G		G	
3 Excavation, earth or common (1)	8.61	4.97	8.20	6.66	5.60	3.79	3.43	N.A.	11.06	2.97	3.47	3.59		4.55	
4 Excavation, rock (1)	11.41	9.31	8.20	12.06	10.18	4.70	4.68	10.57	16.63	3.95	4.87	6.99		9.58	
5 Concrete Work, engineering structures (2)	24.25	11.58	11.15	13.77	13.09	6.92	8.01	14.32	18.84	5.80	8.94	8.57		N.A.	
6 Concrete Work, buildings not over 3 stories	4.04	6.32	11.15	6.60	4.11	2.08	2.64	8.52	6.09	3.02	2.41	4.54		3.32	
7 Concrete Work, buildings over 3 stories	14.48	7.45	11.15	9.19	9.14	4.44	4.77	8.52	12.21	3.67	4.66	5.42		10.07	
8 Concrete Work, reinforced floors	14.48	7.45	11.15	9.19	9.14	4.44	4.77	8.52	12.21	3.67	4.66	5.42		10.07	
9 Concrete Work, pavement	8.00	5.95	Y10.00	7.18	6.11	2.92	4.03	7.46	11.20	2.25	4.42	4.33		5.26	
10 Carpentry, concrete form construction	14.74	8.49	4.65	8.88	8.30	4.42	5.05	8.52	11.64	3.92	4.99	6.18		6.46	
11 Carpentry, buildings 3 stories or under	6.29	4.24	4.65	4.20	4.88	2.71	2.64	4.93	6.55	2.24	2.75	3.06		6.46	
12 Carpentry, buildings over 3 stories	14.74	8.49	4.65	8.88	8.30	4.42	5.05	8.52	11.64	3.92	4.99	6.18		6.46	
13 Carpentry, interior trim buildings	3.33	2.94	4.65	2.01	1.70	1.36	1.34	2.31	2.91	1.13	1.47	2.09		6.46	
14 Structural Iron and Steel erection	33.42	25.59	21.35	24.90	20.60	12.65	11.89	33.27	34.21	10.85	12.80	18.99		18.09	
15 Ornamental Iron erection	6.35	4.80	21.35	4.43	3.63	2.55	2.54	4.79	6.11	2.16	2.64	3.50		3.56	
16 Roofing	13.94	10.99	10.00	11.94	9.60	5.73	5.68	13.87	17.08	4.81	5.33	7.98		11.10	
17 Waterproofing	6.74	5.51	N.A.	4.83	3.99	1.81	2.69	5.43	7.04	2.24	2.87	4.07		4.19	
18 Lathing and Plastering	4.44	3.81	2.85	3.86	3.48	1.74	1.80	4.16	5.54	1.50	1.89	2.69		3.19	
19 Bricklaying	4.04	6.32	11.15	6.60	4.11	2.08	2.64	8.52	6.09	3.02	2.41	4.54		3.32	
20 Sheet metal work	5.32	4.28	3.95	4.38	3.77	2.20	2.30	4.72	6.22	1.83	2.41	3.06		3.66	
21 Plumbing, heating, gas fitting	3.85	2.69	2.95	2.64	2.42	1.52	1.65	2.93	3.86	1.32	1.66	1.91		2.30	
22 Glazing	8.90	5.62	N.A.	6.60	5.63	3.67	3.62	6.72	9.74	3.05	3.87	3.94		5.85	
23 Electrical Wiring, installing	3.18	2.59	2.15	2.33	2.25	1.34	1.34	2.66	3.37	1.12	1.43	1.87		2.01	
24 Electrical Equipment, installing	4.87	4.32	2.15	3.94	3.55	2.02	2.12	4.55	5.65	1.69	2.08	3.17		3.18	
25 Painting, struct. steel infield, eng. struct.	33.42	25.59	21.35	24.90	20.60	12.65	11.89	33.27	34.21	10.85	12.80	18.99		18.09	
26 Painting, buildings	7.07	5.01	5.30	4.53	3.77	2.78	2.39	4.59	6.80	2.33	3.17	3.69		3.66	
27 Watchmen and time keepers	4.22	6.49	G	3.53	2.99	1.76	1.73	G	5.14	1.44	1.85	4.69		3.08	
28 Officers and superintendents, supervising	.84	.98	G	.83	.71	.34	.35	7.46	1.12	.32	.36	.72		.67	
29 Office workers	.08	.09	.13	.10	.09	.09	.07	.10	.13	.07	.06	.07		.10	

Bold face type indicates Employers Liability Insurance as provided for in the states in question. (1) No caisson or compressed air work. (2) Bridges, culverts, retaining walls, dams, etc. (3) State Insurance plan. N.A. Classification not available in the state. (A) Rate assigned by Rating Board. (P) Supplementary rate of $0.53 for lead burning. (D) Supplementary O.D. rate of $1.07 subject to reduction for acceptable dust control equipment. (R) Not applicable to concrete work on private residences. (G) Payroll assigned to governing class for job. (Y) Supplementary occupational disease rate of $.03 removable when silicosis hazard is non-existent.

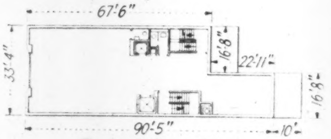
Unit Costs of Various Types of Buildings

MERCANTILE BUILDING:

Multi-story structure for Lilly Dache, millinery manufacturer and retailer, with owner's apartment in 8th floor and penthouse. Concrete footings on rock; concrete foundation walls; structural steel frame; exterior walls of brick with hollow tile backing; street front Indiana limestone to 3rd floor, stucco above; floor construction, cinder concrete slab, fill and cement finish, except in special spaces where finish is Travertine, marble and tile; steel double-hung windows, except front wall which are still projected type; 5-ply roofing with promenade tile and slag finish; exterior walls dampproofed and spandrels waterproofed; all interior walls, partitions and ceilings plastered, with wood, tile or marble base; two automatic elevators; steam heat with boiler; five floors air conditioned; complete plumbing and electric systems. Architect, Shreve, Lamb & Harmon, New York.



Longitudinal Section



Typical Floor Plan

Location	New York City
Year of contract	1937
Volume	293,640 cu.ft.
Floor area	26,334 sq.ft.
Cu.ft. cost	70c.
Sq.ft. cost	$8.50

	Cost Breakdown % of Total	c. cu.ft.	$ sq.ft.
Foundations	7	4.9	0.595
Structural Steel	11	7.7	0.935
Masonry	12	8.4	1.02
Floor arches and finish	6	4.2	0.51
Elevators	7	4.9	0.595
Lath and plaster	6	4.2	0.51
Plumbing	7	4.9	0.595
Heating, ventilating	9	6.3	0.765
Air conditioning	10	7.0	0.85
Electrical	7	4.9	0.595
Miscellaneous	18	12.6	1.53
	100	70.0	8.50

COTTON MILL EXTENSION:

Three stories; concrete footings; brick walls with steel sash; cast-iron columns; steel beams; wooden floors and roof decking; 20-yr. T. & G. roofing; white paint on interior—no plaster; miscellaneous equipment includes only the plumbing. J. E. Sirrine & Co., Greenville, S. C., Engineers.

Location	North Carolina
Year of Contract	1937
Volume	656,000 cu.ft.
Area	40,600 sq.ft.
Cu.ft. cost	8.3c.
Sq.ft. cost	$1.35

STORAGE BUILDING EXTENSION:

Five stories; concrete footings; brick walls with steel sash; riveted structural steel frame; wooden floors and roof decking; 20-yr. T. & G. roofing; white paint on interior—no plaster; no miscellaneous equipment included. J. E. Sirrine & Co., Greenville, S. C., Engineers.

Location	Alabama
Year of Contract	1937
Volume	484,000 cu.ft.
Area	38,000 sq.ft.
Cu.ft. cost	13.1c.
Sq.ft. cost	$1.67

HIGH SCHOOL:

Three stories; square-type building with rectangular open court; concrete foundation; brick walls with steel windows; steel and wooden frame; concrete floors on first floor, maple floors and asphalt tile elsewhere; 10-yr. T. & G. roofing; plastered walls; acoustical tile ceilings; miscellaneous equipment includes plumbing, heating, and electrical work. J. E. Sirrine & Co., Greenville, S. C., Engineers.

Location	South Carolina
Year of Contract	1937
Volume	2,001,000 cu.ft.
Area	166,000 sq.ft.
Cu.ft. cost	21.0c.
Sq.ft. cost	$2.53

	Cost Breakdown % of Total	c. cu.ft.	$ sq.ft.
Building	80.47	16.9	2.04
Heating	7.15	1.5	.18
Electrical	6.43	1.3	.16
Plumbing	5.95	1.3	.15
Total	100.00	21.0	2.53

FACTORY:

Three stories; concrete footings; brick walls and steel sash; riveted structural steel frame; wooden floors and roof decking; white paint on interior—no plaster; 20-yr. T. & G. roofing; miscellaneous equipment includes only the plumbing. J. E. Sirrine & Co., Greenville, S. C., Engineers.

Location	North Carolina
Year of Contract	1937
Volume	1,028,000 cu.ft.
Area	55,400 sq.ft.
Cu.ft. cost	9.9c.
Sq.ft. cost	$1.84

COLLEGE BUILDING:

Four stories; concrete footings; brick walls with steel sash; structural steel frame; concrete floors in the basement, and maple floors and asphalt tile elsewhere; steel partitions throughout; some walls plastered and some painted brick; acoustical tile ceilings; steep roof with Mission tile; miscellaneous equipment includes plumbing, heating, and electrical work. J. E. Sirrine & Co., Greenville, S. C., Engineers.

Location	South Carolina
Year of Contract	1937
Volume	2,063,000 cu.ft.
Area	136,000 sq.ft.
Cu.ft. cost	22.5c.
Sq.ft. cost	$3.42

	Cost Breakdown % of Total	c. cu.ft.	$ sq.ft.
Building	83.82	18.9	2.86
Heating	5.81	1.3	.20
Electrical	7.58	1.7	.26
Plumbing	2.79	0.6	.10
Total	100.00	22.5	3.42

FACTORY:

One story; concrete footings; brick walls with steel sash; riveted structural steel frame; wooden floors on tar concrete; wooden roof decking; monitor; 20-yr. T. & G. roofing with cork insulation; white paint on interior—no plaster; miscellaneous equipment includes only plumbing. J. E. Sirrine & Co., Greenville, S. C., Engineers.

Location	Georgia
Year of Contract	1937
Volume	393,000 cu.ft.
Area	20,363 sq.ft.
Cu.ft. cost	10.6c.
Sq.ft. cost	$2.04

SMALL HOUSES:

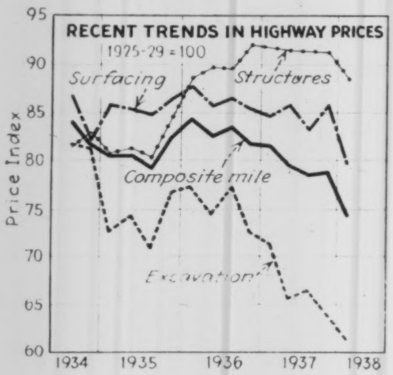
The Federal Home Loan Bank Board reports monthly the cost of building a 6-room 2-story house of 24,000 cu.ft. volume in representative cities. Although costs do not include such items as wall paper, refrigerator, screens or lighting fixtures, they do cover all essential heating, plumbing and wiring, as well as complete insulation. Land is not included nor are architects' fees or financing charges, but compensation insurance, contractor's overhead and 10 per cent profit are a part of the cost. Between January and April, 1938, costs decreased in 17 of 22 cities, largely as a result of lower materials costs. In April, the house would have cost $7137 in Great Falls, Mont. and $6628 in St. Paul, the highest cities. Lowest cities were Newark, N. J. ($5427) and Portland, Ore. ($5448). April cubic foot costs during the past 3 years are tabulated below:

	April 1938	April 1937	April 1936
Camden, N. Y.	23.7c.	24.5c.	21.5c.
Newark	22.6	23.6	21.2
Buffalo, N. Y.	25.3	25.6	22.9
White Plains	25.8	25.6	23.8
Evansville, Ind.	24.0	24.2	23.2
Indianapolis	24.5	24.3	22.7
South Bend	24.8	26.6	24.4
Detroit, Mich.	24.9	25.2	21.9
Grand Rapids	24.6	23.4	21.8
Des Moines, Ia.	25.6	26.6	25.1
Duluth, Minn.	26.3	24.6	23.4
St. Paul	27.6	26.9	22.1
Kansas City, Mo.	24.1	24.1	22.1
St. Louis	25.5	27.5	25.3
Fargo, N. D.	24.7	24.9	22.9
Sioux Falls, S. D.	25.8	24.8	23.4
Boise, Idaho	24.7	25.8	23.8
Great Falls, Mont.	29.7	29.3	27.1
Portland, Ore.	22.7	24.5	21.8
Salt Lake City, Utah	26.0	25.7	24.1
Seattle, Wash	26.8	27.6	23.4
Spokane	27.3	27.3	24.5

Highway Construction Cost Trends

HIGHWAY COSTS, which have been declining slowly since early in 1936, registered a sharp drop for the first quarter of 1938, according to the index of average bid prices on federal aid projects prepared by the construction division of the U. S. Bureau of Public Roads. The index is based on composite mile average prices for 1925-1929, and the quantities are considered constant for comparative purposes, although, in reality, quantities are constantly increasing. The base prices and quantities are shown at the head of the accompanying table. The Bureau's index based on current quantities has been discontinued temporarily because it was found federal-aid operations often involve only part of the total construction on a project.

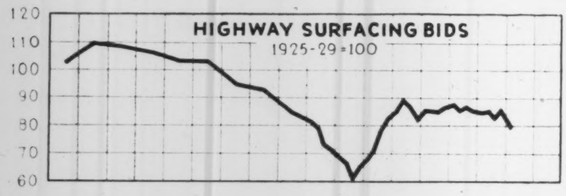
Most interesting is the trend of excavation prices, which are dropping far below the range of average surfacing and structure prices, due largely to the influence of heavy, modern earth-moving equipment.

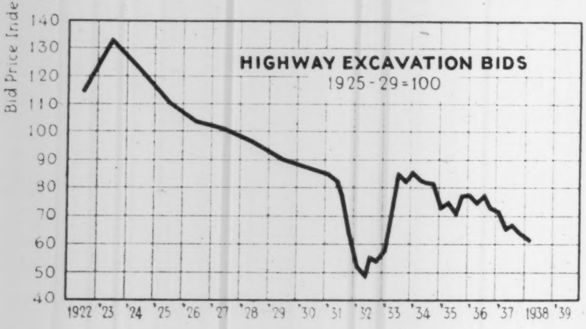


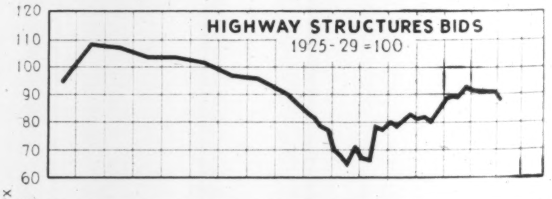
PRICE TREND IN HIGHWAY CONSTRUCTION FOR COMPOSITE STANDARD MILE

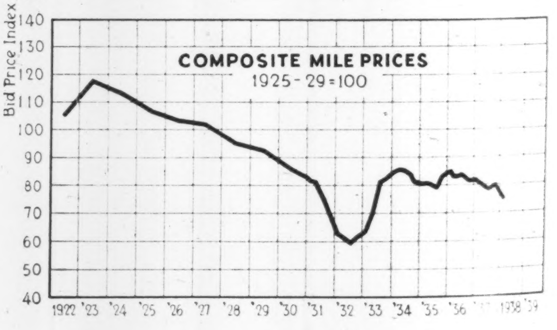
Year	Excavation[1] (17,491* cubic yards)		Surfacing[2] (3,726* square yards)		Structures				Composite mile
					Reinforcing steel (16,000* pounds)	Structural steel (4,325* pounds)	Structural concrete (68* cubic yards)	Combined	
	Bid price[3]	Sub-index	Bid price[3]	Sub-index	Bid price[3]	Bid price[3]	Bid price[3]	Sub-index	Index
Base period, 1925 to 1929	$0.35†	100.0	$2.22†	100.0	$0.052†	$0.067†	$22.15†	100.0	100.0
1922	.40	114.5	2.28	102.7	.050	.074	20.18	95.1	105.8
1923	.47	133.3	2.43	109.5	.057	.078	23.37	108.6	117.9
1924	.43	122.2	2.40	108.3	.057	.077	22.91	107.2	113.1
1925	.39	110.0	2.36	106.4	.056	.067	22.53	103.9	107.3
1926	.36	103.7	2.29	103.1	.053	.074	22.76	103.7	103.4
1927	.35	100.3	2.29	103.3	.051	.071	22.65	101.5	101.9
1928	.34	96.0	2.10	94.5	.049	.067	21.22	96.1	95.3
1929	.32	90.0	2.05	92.7	.048	.059	21.58	95.0	92.1
1930	.30	86.3	1.86	84.1	.045	.061	20.08	89.4	85.7
1931									
1st Q.	.30	84.6	1.79	80.7	.042	.055	18.90	83.7	82.6
2nd Q.	.29	82.6	1.77	79.6	.041	.051	18.48	81.3	81.0
3rd Q.	.27	76.6	1.59	71.7	.040	.052	17.49	78.0	74.4
4th Q.	.23	65.0	1.56	70.3	.037	.056	17.22	76.6	69.3
1932									
1st Q.	.18	51.6	1.52	68.4	.036	.049	15.22	69.3	62.5
2nd Q.	.17	48.7	1.47	66.3	.034	.045	14.98	66.8	60.1
3rd Q.	.19	54.7	1.35	61.0	.033	.043	14.82	65.5	59.4
4th Q.	.19	54.1	1.44	65.1	.033	.048	16.28	70.3	61.9
1933									
1st Q.	.20	57.0	1.49	67.2	.032	.043	15.44	66.4	63.4
2nd Q.	.25	70.7	1.58	71.3	.035	.043	14.67	66.2	70.3
3rd Q.	.30	84.6	1.74	78.6	.041	.049	17.36	78.1	80.7
4th Q.	.29	82.3	1.85	83.5	.042	.049	17.12	77.9	82.2
1934									
1st Q.	.30	85.5	1.90	85.7	.042	.049	17.82	79.9	84.7
2nd Q.	.29	82.6	1.98	89.3	.042	.051	17.31	79.1	85.3
3rd Q.	.29	81.7	1.92	86.7	.042	.053	17.98	81.3	84.0
4th Q.	.29	81.3	1.82	82.1	.044	.057	17.81	82.7	81.9
1935									
1st Q.	.25	72.7	1.90	85.8	.044	.051	17.62	80.7	80.3
2nd Q.	.26	74.1	1.89	85.1	.044	.052	17.51	81.1	80.5
3rd Q.	.25	70.9	1.88	84.8	.044	.052	17.22	80.2	79.1
4th Q.	**.27**	**76.9**	**1.91**	**86.2**	**.044**	**.053**	**18.77**	**84.1**	82.5
1936									
1st Q.	**.27**	**77.2**	**1.94**	**87.7**	**.044**	**0.56**	**20.20**	**88.7**	84.1
2nd Q.	**.26**	**74.4**	**1.90**	**85.8**	**.046**	**0.59**	**20.06**	**89.7**	82.3
3rd Q.	**.27**	**77.2**	**1.91**	**86.3**	**.046**	**0.61**	**19.87**	**89.5**	83.5
4th Q.	**.25**	**72.7**	**1.89**	**85.3**	**.046**	**0.62**	**20.87**	**92.0**	81.8
1937									
1st Q.	**.25**	**71.2**	**1.88**	**84.8**	**.047**	**.063**	**20.31**	**91.7**	81.6
2nd Q.	**.23**	**65.5**	**1.90**	**85.8**	**.049**	**.067**	**19.42**	**91.3**	79.3
3rd Q.	**.23**	**66.3**	**1.85**	**83.3**	**.049**	**.057**	**19.42**	**91.3**	78.4
4th Q.	**.22**	**64.0**	**1.91**	**85.9**	**.048**	**.065**	**19.90**	**91.2**	78.8
1938									
1st Q.	**.21**	**61.2**	**1.77**	**79.7**	**.046**	**.065**	**19.13**	**88.5**	74.4

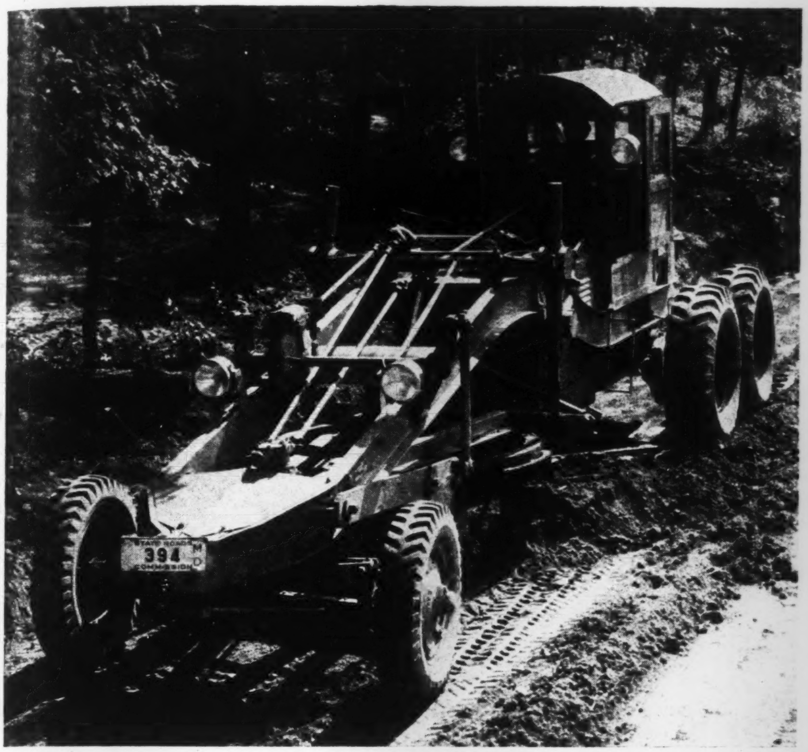
[1] Common excavation plus other excavation items expressed as equivalent common excavation.
[2] Portland-cement concrete plus other surfacing items expressed as equivalent portland-cement concrete.
[3] Indexes and totals were calculated with the bid prices carried to 1 more decimal place than that to which they are shown in this table.
Column showing amount of bid price times fixed quantity omitted in this table.
* Fixed quantities used for establishing composite mile for price trend.
† Fixed prices used for establishing composite mile index base.











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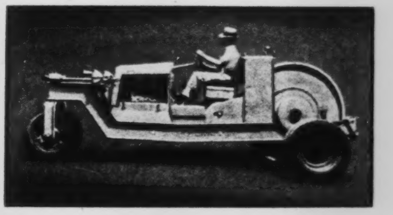

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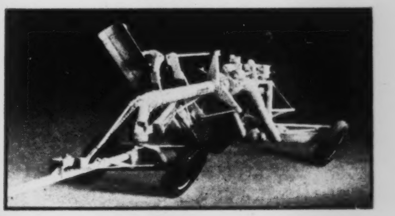

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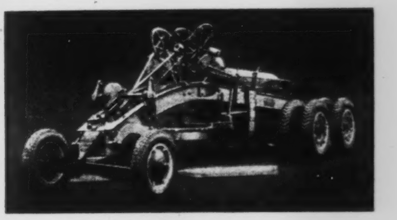

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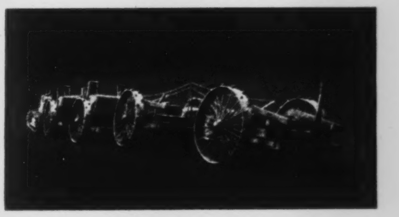

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Concrete and Earthwork Unit Costs and Quantities

CONCRETE AND EARTHWORK are two of the basic heavy construction items. As their cost accounts for a large proportion of the total cost of heavy engineering construction, the trend and fluctuation of prices of these two items is of great importance. Yet it is difficult to establish a price trend for either mass concrete or earthwork, for no two jobs are alike and, even on projects that approach similarity, local conditions and the situation of contractors at the moment affects the unit bidding.

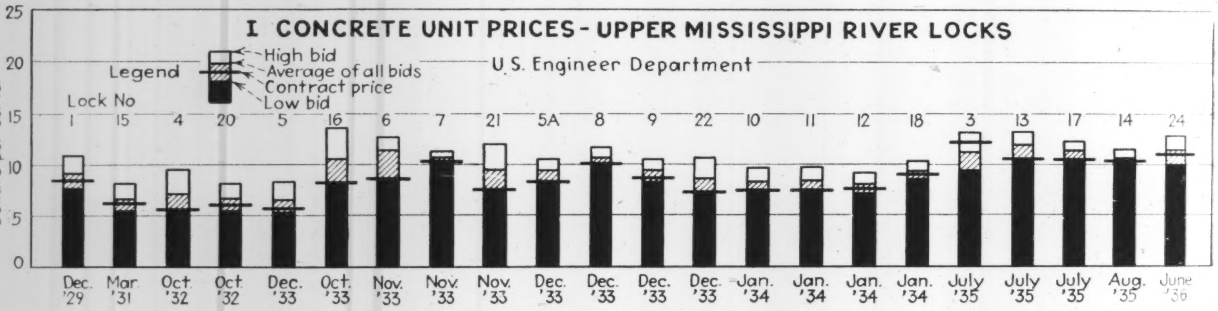
In an effort to analyze costs of these two basic items we turn to the records of two federal agencies—the U. S. Engineer Department and the U. S. Bureau of Reclamation—which have for years awarded contracts for projects of somewhat similar character. A study of the records showed that the most consistent and comparable prices for concrete were those for the locks and dams on the Upper Mississippi River canalization project now nearing completion under the direction of the army engineers. For earthwork prices, those of three general types of projects were found to be fairly consistent: embankment dikes in connection with the Upper Mississippi River dams; irrigation canals built by the Bureau of Reclamation; and earthfill dams built by the same agency. Army engineer records of dredging and levee work were also studied in an attempt to broaden the earthwork coverage, but unit prices of these operations, even under apparently similar conditions, vary so widely that a cost analysis is impossible. Highway excavation price trends are covered in another article in this issue.

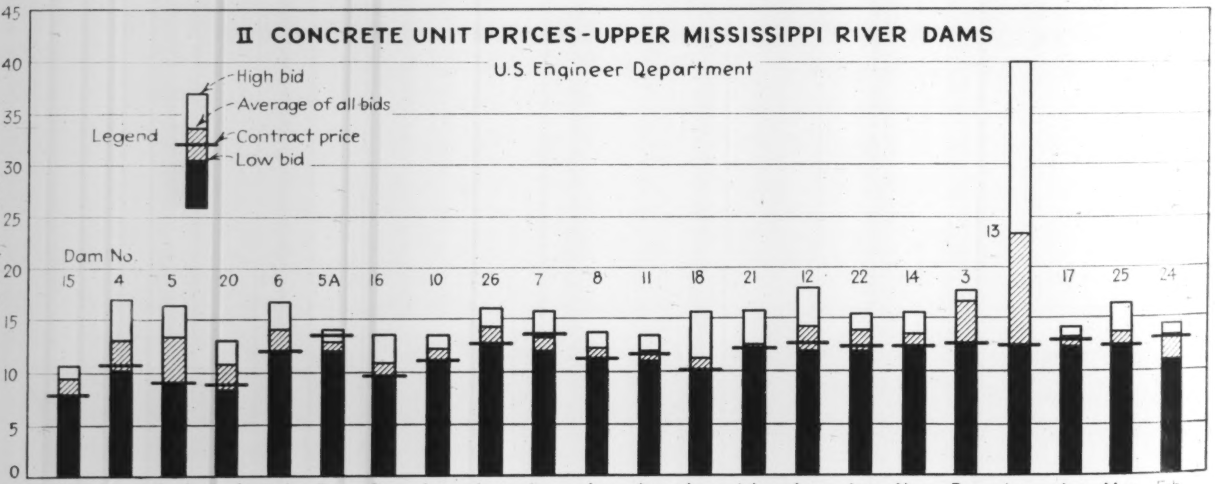
Concrete costs

The complete range of unit bids for concrete—high, low, average and contract—is given in Charts I and II for 22 locks and 22 dams on the Upper Mississippi River. Though concrete accounts for about two-thirds of the total cost of each project, the concrete item is only one of some 80 or 90 items on the bid schedule. Therefore, the contract unit price for concrete is not always the lowest bid for that particular item; in fact, in unbalanced bids it is sometimes the highest.

On the lock work the lowest contract price for concrete, $5.56 per cu. yd., was for Lock 5 awarded in December, 1932; the highest contract price, $12.10, was for Lock 3 awarded in July, 1935. The low average of all bids on a project, $6.55, was also on Lock 5, while the high average of $12.00 was on Lock 13, let in July, 1935. Concrete prices on the group of locks let in 1931 and 1932 were lower than for the 1933 and 1934 groups. By midyear, 1935, contract concrete unit prices on the locks had increased to about $11.

Contract unit prices for concrete on the dams (awarded separately and at different times from the corresponding locks) were lowest late in

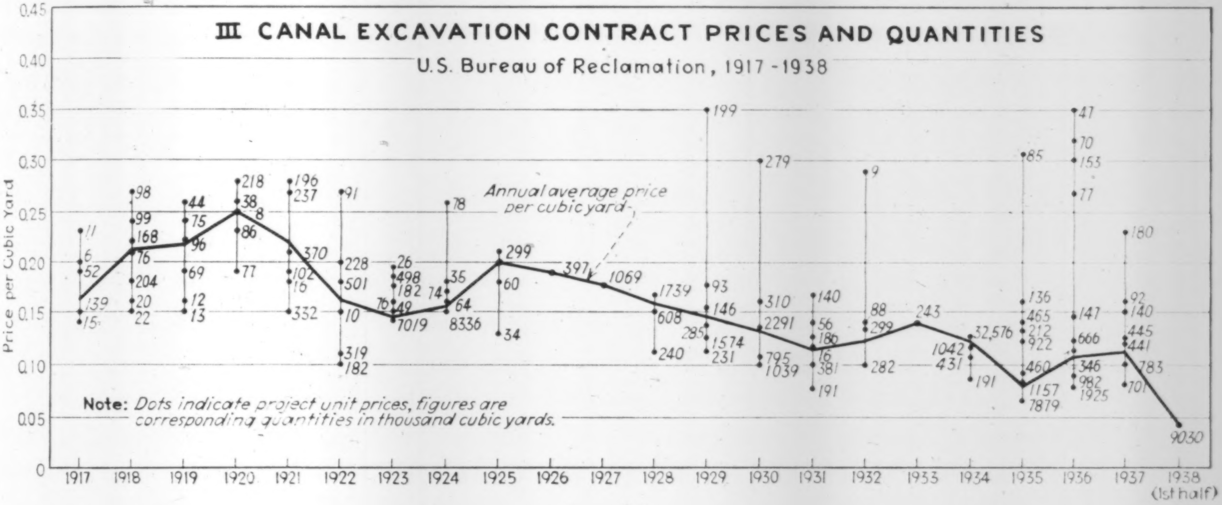




Earth Dam Contract Unit Prices

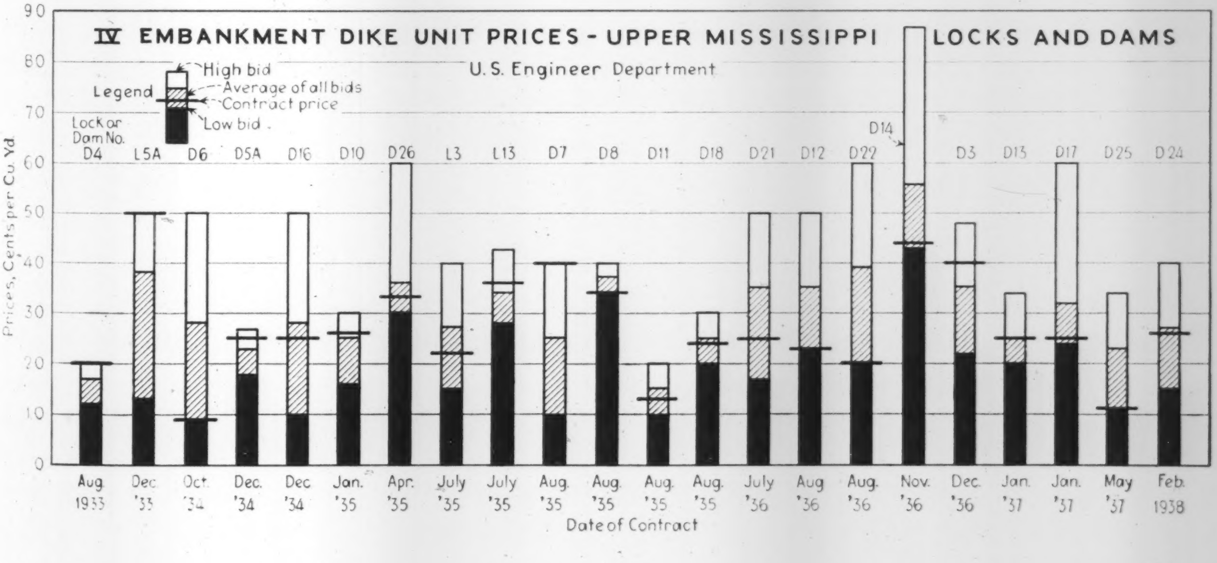
U. S. Bureau of Reclamation

Project and Location	Quan. Cu. Yd.	Contract Unit Prices Excav.	Contract Unit Prices Earth Fill	Contract Unit Prices Total Emb.	Contract Date
Belle Fourche, S. Dak.	1,580,000	......	......	$0 28	Nov. 1905
Hyrum, Utah	469,000	$0.325	$0.09	.415	Jan. 1934
Agency Valley, Ore.	480.000	.29	.10	.39	Feb. 1934
Pine View, Utah	170,000	.44	.11	.55	Sept. 1934
Rye Patch, Nev	215,000	.26	.07	.33	Dec. 1934
Moon Lake, Utah	413,000	.36	.10	.46	Apr. 1935
Taylor Park, Colo	833,000	.26	.09	.35	May 1935
Alcova, Wyo	935,000	.26	.08	.34	Aug. 1935
Island Park, Ida	335,000	.30	.09	.39	Sept. 1935
Bull Lake, Wyo	1,025,000	.25	.09	.34	Jan. 1936
Alamagordo, N. Mex	1,400,000	.21	.06	.27	Feb. 1936
Grassy Lake, Ida	500,000	.25	.10	.35	Oct. 1936
Boca, Nev	870,000	.22	.05	.27	Oct. 1936
Fresno, Mont	1,725,000	.165	.05	.215	Nov. 1936
Vallecito, Colo	3,200,000	.23	.05	.28	Jan. 1938
Deer Creek, Utah	2,700,000	.202	.06	.262	Feb. 1938


III CANAL EXCAVATION CONTRACT PRICES AND QUANTITIES

U.S. Bureau of Reclamation, 1917-1938

Note: Dots indicate project unit prices, figures are corresponding quantities in thousand cubic yards.


IV EMBANKMENT DIKE UNIT PRICES - UPPER MISSISSIPPI LOCKS AND DAMS

U. S. Engineer Department

1931, when concrete for Dam 15 went at $10.58, and reached a high of $13.49 for Dam 5A in December, 1934. From 1931 through 1935 concrete prices fluctuated considerably. On dams let from July, 1936, to February, 1938, contract prices for concrete were remarkably steady, keeping within the 80-cent range between $12.21 and $13.10. The average of all bids per project ranged from $10.73 for Dam 20 in 1933 to $23.28 for Dam 13 early in 1937, the last average being thrown out of line by an unreasonable high bid of $40.00.

Earthwork prices

The price range for earthfill dam embankment work on sixteen reclamation projects is given in the accompanying table. It is interesting to note that the contract price of 28c. for Belle Fourche Dam in 1905, built wholly by teams, scrapers and wagons, is closely comparable with the unit prices for dams let only a few months ago. The highest unit price of all the dams, 55c., was for the smallest of the lot, the 170,000-yd. Pine View project let in 1934, while the lowest price of 21.5c. was for the Fresno Dam late in 1936.

The most tangible trend of earthwork costs is found in contract prices of irrigation canals, plotted in Chart III. The curve of annual average prices, obtained by dividing the extended total of quantities and unit prices by the total yardage, shows a sharp post-war rise, a decline through 1922-24 and a well-defined slow drop from 1925 to date. This last period marks the introduction of mechanical equipment; prior to 1925 the canal work was largely one of team methods. Since 1934 the curve shows the influence of the large quantities and low prices on the All-American Canal, and the sharp drop for early 1938 is due wholly to low bids on the Coachella section of that canal, where the amazingly low price of 1.4c. was turned in only a few weeks ago. Project unit prices and quantities for each year from 1917 to date are also shown on the chart.

The final **Chart IV** depicts the range of bid prices on embankment dikes for the Upper Mississippi projects in the same manner as concrete prices in Charts I and II. High, low, average and contract unit prices are given. It must be remembered the embankment item is only one of many on the bidding schedule, and therefore these prices are influenced by factors other than sole cost. No trend analysis is possible from these widely fluctuating prices, for contract unit bids on projects awarded at the same time vary as much as 300 per cent. However, the chart adds to the general information on earth-handling costs.

Miscellaneous Overhead Costs

Previous chapters in this Construction Cost Guide have dealt with the principal and more tangible cost elements, such as wages, materials prices, cost of earthwork, concrete, highways and bidding schedule items. All of these elements of construction cost have a definite value that can be determined readily, or at least computed fairly accurately. This final chapter will discuss miscellaneous overhead cost items, some of which are tangible, but most of which include factors that are indefinite and intangible.

Such miscellaneous cost items include bonds, compensation and other insurance, social security and unemployment taxes, safety and accident prevention, effect of specification requirements, and equipment costs and depreciation. They will be discussed briefly, principally as contractors' costs.

Bonds and insurance

Performance bonds are usually required on public works contracts, and occasionally on private work. Outside of highway work, where the cost is 1 per cent, the universal rate for bond premiums is 1½ per cent of the total value of the contract, except in the two states of New York and New Jersey, where a 1-per cent premium rate prevails on all classes of work. Bid bonds are usually written without cost to the contractor, providing he buys his performance bond from the same surety company. Some states now require material and labor bonds (independent of lien law provisions) which are also usually included in the cost of the performance bond.

Insurance is a major item of overhead costs. On structures that might be damaged by fire during construction, either the owner or contractor takes out fire insurance covering the value of the completed work. Frequently contractors insure formwork, centering and scaffolding against fire loss. More and more contractors are insuring their equipment against damage from any cause, and few overlook fire coverage on field offices, warehouses, garages and shops.

Public liability is another insurance cost. The rate depends upon the hazard of the work to the public, but it may run as high as 2½ per cent of the payroll. The nation-wide average on highway paving work, for example, is 1.21 per cent.

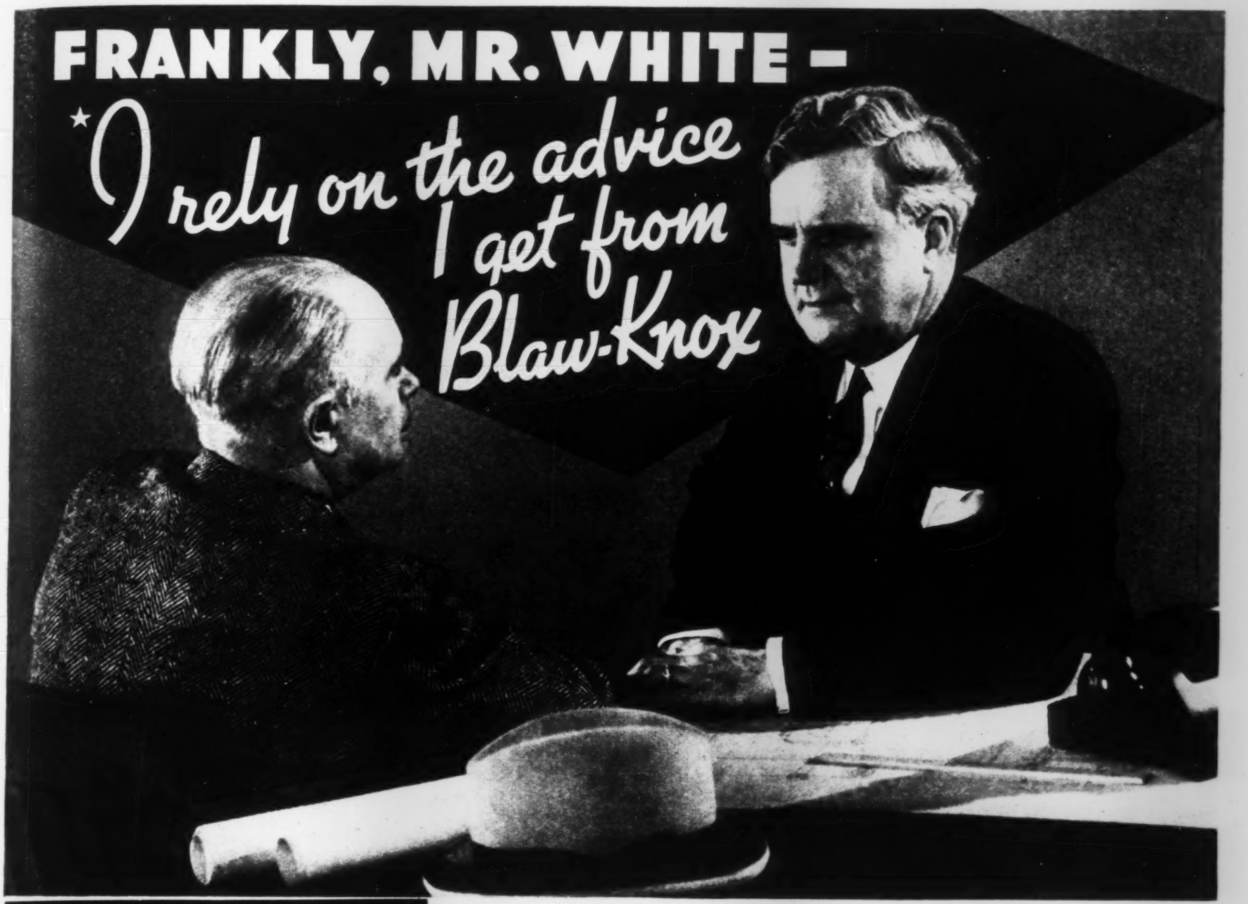
Compensation insurance

Workmen's compensation insurance is the largest single item of expense in construction outside of materials and labor and on some types of work, such as excavation, ranks next to wages. In general, compensation costs are constantly increasing, though new rates, just announced in several states, show a break in certain classifications. The table on page C-90 gives the rates of principal classifications for most of the states.

Because of the variety of classifications and the different applications to individual projects, an average of compensation costs is hard to determine. Contractors estimate an average of from 12 to 15 per cent of payrolls on heavy engineering construction, about 16 per cent on industrial buildings and close to 20 per cent for commercial building work. Twenty-five years ago when compensation insurance was just starting, the average was 3 per cent.

Some rates are extremely high, and there is no relation in rates of identical classifications among the several states. Building demolition rates are $58.02 per $100 payroll in Utah, $12.50 in Delaware; structural concrete rates are $9.37 in Kansas, $24.72 in neighboring Oklahoma. In New York, the structural ironworker rate is $50.00. In New York City, starting with a wage of $1.92½, the compensation costs and other direct payroll taxes bring the cost of an hour of ironworker's time up to $3.00.

The steady increase in compensa-


FRANKLY, MR. WHITE –
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tion insurance rates is due to several conditions: an increasingly liberal interpretation of the laws by courts and compensation boards; higher awards, especially for partial or total disability; and constant demand by organized labor for increased protection, a demand which, on public works, is aided by political favoritism. Then, too, there is no organized effort to keep compensation costs down; the insurance carriers are interested mainly in keeping premium returns above losses, the contractors are prone to regard compensation costs merely as another expense to pass on to the owner, and the owner is helpless to do much as an individual.

Compensation costs tie in with safety and accident prevention. Contractors who are sincere in accident prevention do not regard the cost as an expense, but rather as an investment, for a favorable record for safety is reflected in the credit rating on compensation insurance costs.

Other taxes

Social security and unemployment taxes now amount to 4 per cent of the payroll in most states, exclusive of the employee's contribution. The extra office personnel required to keep track of these items is a considerable expense in the larger construction organizations. Construction stands to be severely penalized in cost when the plan of debit rating on unemployment insurance goes into effect in several states against firms unable to provide continuous employment.

The cost of building permits varies with the location, but in some cities runs as high as 0.3 per cent of the contract. Sales taxes, corporation taxes, and taxes on franchises, use of equipment and materials, capital stock, income and other items add up to a considerable figure which must be included in the cost of construction.

Effect of specifications

Specifications are becoming more rigid as a higher degree of construction excellence is demanded. There is no doubt but what these requirements are increasing the cost of construction, but this is one of those intangible factors impossible to evaluate. For this increased cost the owner, for the most part, is getting better construction. There is no question but what the rigid specifications for concrete, for example, are resulting in a better product. New standards of excellence are demanded in every type of construction—at a price to the owner, of course. With respect to effects of specification clauses one contractor has said: "I figure my bids on an estimate of the way the specifications will be interpreted rather than on the specifications themselves."

Better construction does not always mean more expensive work. An example is the current requirement that highway fills be built in layers rather than by end dumping. Cost analyses show that it is cheaper to dump and spread in layers with modern equipment than it is to haul over unconsolidated end dumps, where maneuvering of heavy trucks and wagons is difficult and expensive. In many instances specification requirements have resulted in new and improved types of equipment that actually lower the cost of work.

Another specification requirement that adds nothing to the value of the work, but which is now regarded as indispensable, is the preservation of the rights of the public. Restrictions on noise, interference with the traveling public and annoyance to surrounding residents are becoming common, but they add to the cost of the work.

Equipment costs

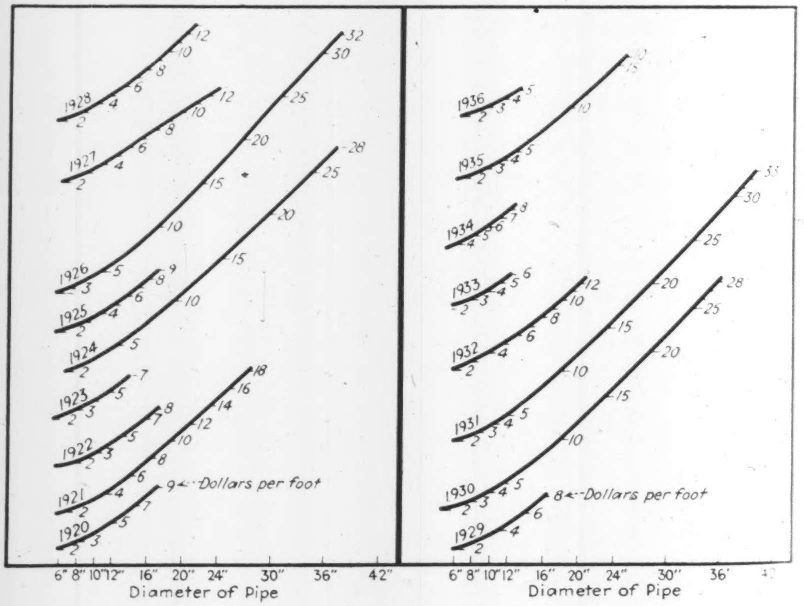
The cost of owning and renting construction equipment has been covered in an earlier chapter of this section. To own heavy equipment, exclusive of the cost of operation, costs from 5 to 10 per cent of the value each working month. These figures include depreciation, heavy repairs, taxes, insurance, and interest. Actual operating costs, which include the wages of the operator, oils, greases, fuel, field repairs and transportation, add greatly to the cost of equipment use.

As stated in the beginning of this article, many of these overhead and general expense items are difficult to evaluate, but they exist and are a definite part of the cost of construction. To them must be added the cost of keeping a construction business alive—the expense of travel, bidding and estimating, office cost and financing. All add up to a considerable cost factor.

Pipe Cost Trends In Kansas City, Mo., By Years

Based on Average Cost Per Foot of Water Mains Laid

Conditions include:—predominance of yellow clay soil but with considerable excavation in limestone and shale; excavation by hand; 4-ft. minimum cover for all pipe; pipe 10 in. diameter and under installed by hand, over 10-in. size handled and installed by truck crane. In 1935, as a representative year, the following amounts were laid: 6-in., 9115 ft.; 8-in., 3177 ft.; 10-in., 848 ft.; 12-in., 1692 ft.; 16-in., 3130 ft. and 20-in., 358 ft. None of the larger sizes of pipe has been laid since 1932.



CONSTRUCTION REPORTS

Engineering and building projects by stage of progress and type reported by ENR correspondents

Construction projects reported in these pages covering the United States and Canada, are of these designated sizes: water supply, earth work, waterworks, $15,000 and over; other public works, $25,000 and over; industrial buildings, $40,000 and over; other buildings, $150,000 and over; covering foreign construction, $500,000 and over.

They are classified in the following groups, named in the order of their publication: Water Supply . . . Sewers, Waste Disposal . . . Bridges, Grade Crossings . . . Streets and Roads . . . Earthwork, Waterways . . . Unclassified . . . Materials, Equipment . . . Reports from Abroad . . . Public Buildings . . . Commercial buildings . . . Industrial Buildings.

They are reported in these stages: proposed (except Streets and Roads); bids asked; low bidders (projects of $500,000 and over); contracts awarded. Where a previous report has been carried the issue date is noted on the current report. In each stage reports are arranged in geographical order, first by state then by city or town.

Symbols and abbreviations include:

†	Federal Government
★	Project of $500,000 or over
ENR	Engineering News-Record
CD	McGraw-Hill Construction Daily

WATER SUPPLY

PROPOSED WORK

Ala., Midway—City, T. C. Collier, mayor, plans waterworks. $30,909. P.W.A. allotted $13,909 grant, and $17,000 loan. J. B. McCrary, 22 Marietta St. Bldg., Atlanta, engrs.

Ala., Montgomery — City, W. A. Gunter, mayor, plans waterworks mains for distribution. $30,300. P.W.A. grant made. J. M. Garrett, city engr.

Ala., Sylacauga — City, J. A. Ogletree, mayor, plans waterworks. $65,500. P.W.A. allotted $36,000 loan. Wiedeman & Singleton, Candler Bldg., Atlanta, engrs.

Calif., Fresno — City plans 100,000 gal. water storage tank, steel or concrete or a combination of steel, concrete. $90,000 or more. Noted May 13, CD—May 19, ENR.

Conn., Danbury—City making plans in progress water project incl. water gates, watermains, Shelter Rock Rd., Hillside Ave., Cleveland St. and Rocky Glen Rd., involving 2,800 ft. 6 in mains, $10,000; also incl. drawing maps and indexing. Total est. $20,900. L. A. Davis, City Hall, engr.

Ga., Nicholls—City, D. Anderson, mayor, plans waterworks system. $25,400. P.W.A. allotted $11,430 grant. J. B. McCrary, 22 Marietta St. Bldg., Atlanta, engr.

Ga., Rome—City Comn., H. H. Keel, chn., plans waterworks. $447,151. P.W.A. allotted $201,218 grant. Robert & Co., Bona Allen Bldg., Atlanta, engrs.

Ga., Union City — City plans waterworks system, incl. well, pump, tank and distributing system. $25,454. P.W.A. allotted $11,454 grant. J. B. McCrary, 22 Marietta St. Bldg., Atlanta, engr.

Idaho, Twin Falls—City plans constructing 5 m.g. reservoir. $80,000.

Ill., Glen Carbon—Village, c/o F. Vanda, pres., making plans waterworks system. $80,000. Russell & Axon, 4903 Delmar Blvd., St. Louis, Mo., engrs. Seeking W.P.A. funds.

Ill., Sandwich — City, election July 5, to vote $20,000 bonds, waterworks improvements, incl. new well, iron removal and zeolite softening plant, etc. Seeking P.W.A. grant. Suhr, Berryman, Peterson & Suhr, Inc., 130 North Wells St., Chicago, engrs. Noted June 2, CD—June 9, ENR.

Ind., Glenwood — Town Bd., F. Cameron, chn., plans waterworks and distribution system, incl. deep well, deep well pump, 60,000 to 75,000 gal. steel storage tank, c.i. mains, 20 fire hydrants, service lines $40,000. Civic election June 17 resulted in 2 to 1 vote that town vote bonds. Engineer not appointed.

Ia., Elk Horn—Municipality plans waterworks system. To exceed $28,000.

Ia., Fairfield—City plans waterworks improvement. $22,727. P.W.A. allotment approved. A. A. Reichstein, city engr.

Ia., Harcourt — City plans constructing municipal waterworks system. Est. about $15,000. Voters signed approval of project at election held June 20. Noted June 9, CD—June 23, ENR.

Kan., Quenemo—City, election July 1 to vote $14,000 bonds extending water distribution system and sewer extensions. $19,000. Will receive W.P.A. aid. Engineering Service Co., Railway Exch. Bldg., Kansas City, Mo., engrs. Noted Apr. 20, CD—Apr. 28, ENR.

Mo., King City — City, c/o C. Pettijohn, mayor, soon takes bids water filtration plant, complete with auxiliary equipment, piping and appurtenances, also sewerage system, incl. about 17,100 ft. 8- to 12-in. vitr. clay pipe, 2,100 ft. 6 in. c.i. pipe and sewage disposal plant, incl. Imhoff tank, trickling filters, piping and appurtenances, etc. $65,000. P.W.A. allotted $29,250 grant. C. A. Haskins & Co., Finance Bldg., Kansas City, engrs. Noted May 10, 1937, CD—May 13, 1937, ENR, under "Waterworks" and Dec. 2, CD—Dec. 9, ENR, under "Sewerage and Waste Disposal."

Mo., North Kansas City—Clay County Public Water Dist. 2, J. A. Spencer, Pleasant Valley Subdivision, plans election in July to vote bonds for water distribution system throughout district. $53,000. Henrici-Lowry Eng. Co., 114 West 10th St., Kansas City, Mo., engrs. Noted June 10, CD—May 26, ENR.

Mo., St. Clair—City, c/o L. Meyer, mayor, making plans waterworks and distribution system. $50,000. Seeking W.P.A. funds. Russell & Axon, 4903 Delmar Blvd., St. Louis, engrs.

Neb., Falls City—City plans new water supply system. $400,000. Black & Veatch, 4706 Bway., Kansas City, Mo., engrs.

N. J., Spring Lake Heights—Boro making plans municipal water station. $30,000. C. W. Birdsall, 1700 E St., Belmar, engr.

N. Y., Batavia—City plans water supply system. $144,368. P.W.A. allotted $64,495 grant for same. Noted May 2, CD—May 5, ENR.

N. Y., Durhamville—Village plans water supply system. $30,000. Will select engineer soon.

N. Y., East Syracuse—Village plans water softening plant. $25,000. G. H. Evans, pres. Village Bd., heads the project. Plans bond election later on for same.

N. Y., Lewiston—Village plans c.i. water mains in various streets. $89,820. P.W.A. allotted $40,419 grant. A. G. Leopold, Lombardy St., Lancaster, engr.

N. Y., Watervliet—City plans 1 m.g.c. rein. con. reservoir, also about 15,000 lin. ft. 24 in. c.i. watermains. $165,000. Will apply for 45% P.W.A. grant from funds appropriated by Congress. Solomon & Keis, 257 Bway., Troy, engrs.

N. Y., West Hempstead (P. O. Hempstead)—City plans water supply system. $107,145. P.W.A. allotted $48,215 grant. Owner's engineer, engr.

N. Y., Yonkers—City, City Hall, plans 1 m.g.c. water tank on Nodine Hill. $108,000. P.W.A. allotted $48,735 grant. E. J. Murray, comr. P. Wks. Noted May 19, CD—May 26, ENR.

N. C., Kenly—Town election July 5, to vote $29,000 bonds for water supply system. L. Z. Woodward, mayor.

N. C., Princeton—Town election July 19, to vote $18,000 bonds for waterworks system, and $15,000 bonds for sewerage system. W. J. Massey, mayor.

N. C., Rich Square—City, V. D. Strickland, mayor, plans waterworks and sewerage system. $103,636. P.W.A. allotted $46,636 grant and $57,000 loan. W. F. Freeman, High Point, consult. engr.

O., Newark—Bd. Control bids in about 30 days new electric pump to replace one which has been in use in waterworks plant for more than 30 years. $28,000. Noted Mar. 2, CD—Mar. 10, ENR.

Ore., Oceanlake—Oceanlake Water Dist., R. Dodd, secy., soon takes bids constructing 100,000 gal. water reservoir with fittings and connections.

Pa., Central City—Boro Council, W. Wechtenhiser, councilman in charge, plans purchasing plant and distributing system of Central City Water Co. To exceed $15,000. Boro will improve and extend facilities of system when acquired.

Tenn., Erin — City, C. D. Boone, mayor, plans improving waterworks. $47,273. P.W.A. allotted $21,273 grant and $26,000 loan. C. N. Harrub Eng. Co., American Natl. Bank Bldg., Nashville, engrs.

Tenn., Knoxville — City, W. M. Mynatt, mayor, plans waterworks. $200,000. P.W.A. allotted $90,000 grant. M. B. Whitaker, c/o Knoxville Water Dpt., engrs.

Tenn., South Fulton — City, J. H. Lowe, mayor, plans improving waterworks system. $87,272. P.W.A. allotted $39,272 grant and $48,000 loan. L. O. Brayton Eng. Co., Dyersburg, engrs.

Tenn., Waynesboro—City, J. C. Hartup, mayor, plans waterworks system. $40,000. P.W.A. allotted $18,000 grant and $22,000 loan. S. M. McMurray, American Trust Bldg., Nashville, engrs.

Tex., Barstow—City, c/o J. L. Bilberry, mayor, making plans waterworks improvement, incl. water well pumphouse, elevated storage tank, distribution system, meters, etc. $55,000. P.W.A. allotted $24,545 grant, $30,000 loan. Koch & Fowler, Great Natl. Life Bldg., Dallas, engrs. Noted Nov. 19, CD—Nov. 26, ENR.

Tex., Beckville—City, c/o J. W. Briggs, mayor, plans distribution system well, elevated tank, meters and valves. $26,363. P.W.A. funds allotted. F. J. Von Zuben, Electric Bldg., Fort Worth, engr. Noted Nov. 19, CD—Nov. 26, ENR.

★ **Tex., Big Spring**—City, c/o E. V. Spence, mayor, plans earth dam with gravel blanket, stone rip rap, outlet pipe and spillway structure, intake tank and pumps, 9 mi. 14 in. pipe line from lake to city filtration plant and elevated tank and concrete reservoir. $500,000. P.W.A. allotted funds. J. E. Ward, Harvey Snider Bldg., Wichita Falls, engr. Noted Mar. 3, CD—Mar. 10, ENR.

Tex., Ector—City, B. F. Butts, secy., plans waterworks system improvements, incl. new distributing lines, pumping equipment, etc. $25,000. Hawley, Freese & Nichols, Capps Bldg., Fort Worth, and c/o Ector, engrs.

Tex., Electra—City, c/o A. B. Corder, mayor, making plans constructing waterworks improvements. $75,000. P.W.A. funds allotted. J. E. Ward, Harvey-Snider Bldg., Wichita Falls, engr. Noted June 15, CD—June 23, ENR.

Tex., Garrison—City, c/o Mrs. Maud Irwin, mayor, making plans waterworks improvements, incl. water well, pump and pumphouse, distribution system, 50,000 gal. steel tank. $33,000. P.W.A. allotted $30,545 loan and grant. J. C. McVea, 1318 Kippling St., Houston, engr.

Tex., Hamlin—City, c/o J. B. Eakin, city secy., plans waterworks improvements, incl. reservoir, pipe line, filter bed and addition to Moore Dam. $145,000. P.W.A. allotted $66,450 grant. W. A. Riney, 341 Peach St., Abilene, engr.

Tex., Iowa Park—City, c/o G. G. Clark, mayor, making plans waterworks improvement, incl. earthen dam, filtration plant and reservoir. $36,000. P.W.A. funds allotted. O. N. Floyd, Burt Bldg., Dallas, engr.

Tex., Port Arthur — See "Sewerage and Waste Disposal."

Tex., Rankin—City, c/o Mayor, plans improving waterworks system, incl. water well, pumphouse and equipment, elevated storage tank, surface reservoir distribution system and purchase existing system. $45,000. P.W.A. allotted $18,000 grant and $22,000 loan. J. Pittmann, Box 161, Rankin, engr.

Tex., Raymondville—City, H. D. Campbell, making plans waterworks filtration plant. $30,000. H. R. Helland, Frost Bank Bldg., San Antonio, engr.

Tex., Rhome — City, c/o J. H. McGlothlin, mayor, making plans waterworks improvements, incl. water well, pumping equipment, 50,000 gal. elevated tank, 50,000 gal. ground storage reservoir, valves, hydrants, meters, etc. $35,000. P.W.A. funds allotted. F. J. Von Zuben, Electric Bldg., Fort Worth, engr.

Tex., Roby—City, G. F. Britton, mayor, plans waterworks improvements, consisting concrete dam, spillway, chemical treating plant. H. N. Roberts, 2415 20th St., Lubbock, engr.

Tex., Victoria—City, c/o B. T. Jordan, mayor, making plans improving waterworks system, incl. new elevated tank and tower, c.i. mains, pumphouse and equipment, improving ground storage reservoir venturi meter, fire hydrants, etc. $73,000. P.W.A. funds allotted. E. F. Miles, Victoria, engr.

Man., Brandon—Municipality making plans sedimentation basin at waterworks, etc. $25,000. R. MacFarlane, Town Hall, engr.

Ont., Preston—Water Comn. plans increasing water supply. Additional pumps and

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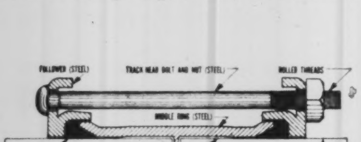
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Water Supply (Continued)

mains will be required. $25,000. Gore & Storrie, 1120 Bay St., Toronto, engrs.

Ont., West Lorne—Municipality, c/o J. S. Robertson, clk., 89 Gladstone Ave., St. Thomas, making plans waterworks and 10½ mi. main extensions. $125,000. Gray & Plunkett, 158 Goderich St., Fort Erie, engrs. Noted Mar. 30, CD—Apr. 7, ENR.

Que., Chicoutimi—Municipality, H. L. Duhaine, mayor, making plans rapid sand filtration plant and equipment. $190,000. Lavoie & Delisle, 7 Racine St., engrs.

Que., Coteau Station—Vandrale Water Works Ltd. making plans extending waterworks and extensions in surrounding villages. $20,000. E. Gohier, 10 St. James St. E., Montreal, engr.

Sask., Moose Jaw — Municipality making plans concrete reservoirs at Gilroy and Beldneck. $70,000. A. W. E. Fawkes, City Hall, engr

BIDS ASKED

Calif., San Francisco—July 12, by City Park Comn., Park Lodge, Golden Gate Park, constructing intake for swimming pool at Fleishhacker Playfield, Skyline Blvd. F. G. White & H. E. Squire, Ferry Bldg., engrs.

Ia., Hull—City bids about July 8, new well tank on power pumping equipment, etc., $11,000. Voted $14,000 bonds for same. Buell & Winter Eng Co., 508 Insurance Exch. Bldg., Sioux City, engrs. Noted May 17, CD—May 19, ENR.

O., Mentor—July 6, by Village, 2 deep wells, 24 in., 50 ft. deep. P. Elwell, 5005 Euclid Ave., Cleveland, engr. Noted Mar. 18, CD—Mar. 24, ENR.

Wash., Seattle—July 7, by Parker & Hill, engrs., Smith Tower, drilling 8 in. cased well at Angle Lake, for Water Dist. 53. $1,700.

CONTRACTS AWARDED

Calif., Oakland—J. Kimball, secy. East Bay Municipal Utility Dist., 512-16th St., removal of Mt. Clair Tank (216,000 gal. capacity), now located on Drake Dr., near Snake Rd., to new site on Skyline Blvd., Proposal 1037, to Pioneer Wrecking Co., 818-45th Ave., San Francisco, **$1,020.** Noted June 9, CD—June 16, ENR.

Fla., Miami Beach—City, constructing 28th St. steel reservoir, to Bethlehem Steel Co., Bethlehem, Pa., **$35,000.** Bids June 8, awarded June 10. Noted May 24, CD—May 26 ENR.

Mass., Springfield—City, constructing Lake Drive pumping station foundation, 20x20 ft., 3 story below grade, 1 story above building 18x18 ft., incl. pump room, rack room, brick, cast stone construction, to J. G. Roy & Sons Co., 21 Silver St., **$13,731;** equipment, to Starkweather Eng. Co., Inc., 246 Walnut St., Newtonville, **$5,129.** Bids June 14. Noted June 3, CD—June 9, ENR.

Neb., Stockville—City constructing water supply and distribution system, **W.P.A.** labor. **$15,005.** W.P.A. allotment approved.

N. J., Greystone Park — Institutions & Agencies, Trenton, pumps and water lines in connection with reconstruction of power house at New Jersey State Hospital, to Kuchar Bros., Franklin Ave., Montvale, **$17,800.** Bids June 14. Noted June 3. CD—June 9, ENR.

N. J., Parsippany—Town, constructing 6 in. watermain at Lake Parsippany, relief labor. **$31,461. W.P.A.** Materials will be purchased by Town and W.P.A. in ratio of 5 to 1. W. J. Burke, foot of 5th Ave., Paterson, W.P.A. and owner's engr. Noted May 23, CD—May 26, ENR.

N. C., Canton—Town, laying water and sewer lines. **W.P.A.** labor. **$5,754.** G. W. Coan, Jr., Raleigh, state administrator.

N. C., Raleigh—City, laying 8,378 ft. 6 in. c.i. pipe, and 4,200 ft. 2 in. water pipe and 12,950 ft. sewer pipe in vicinity of Watson and South Parks, **W.P.A.** labor. **$35,427.** G. Isley, mayor. G. W. Coan, Jr., Raleigh, state administrator.

N. C., Southern Pines—Town, constructing spillway and pier at city water supply dam. **W.P.A.** labor. **$7,641.** D. G. Sturz, mayor. G. W. Coan, Jr., Raleigh, state administrator.

N. C., Wake Forest—Town, laying watermains and sanitary sewers, **W.P.A.** labor. **$10,648.** A. J. Davis, mayor. G. W. Coan, Jr., Raleigh, state administrator.

O., Caldwell—Village constructing modern filtration plant to serve village, **W.P.A.** labor. **$100,000.** W.P.A. grant $40,778 has bene approved. Bids in about 50 or 60 days. Noted Mar. 24, CD—Mar. 31, ENR.

Okla., Wilson—City lowering and extending water mains. **W.P.A.** labor. **$14,500.** W. L. Benham, 431 Main St., Oklahoma City, engr.

Ore., Bend—City, improving water system, day labor. **$37,990.** W.P.A. approved $18,789 allotment. W. H. Cochran, Bend, resident W.P.A. engr. Noted May 18, CD—May 26, ENR.

Pa., Allentown—City, concrete, brick pump house and appurtenances for Water Dpt. in 16th Ward, to D. and C. Spinosa Co., Allentown; furnishing, installing electrical pumping machinery and electrical equipment for booster station, Municipal Water Dpt., 16th Ward, to William H. Taylor Co., Inc., Alle town. Total est. exceeds **$20,000.** E. Meckl city engr.

Pa., Erie—City, Bureau Water, install 6 and 8 in. c.i. mains in West 8th St Water Works Park on Erie Peninsula. La Erie, own forces. Est. **$18,000** plus. J Dunwoody, supt. Water Dpt., 701 French Noted June 2, CD—June 9, ENR.

Pa., North East—Borough, improving b ough water supply system, incl. install tion of new manholes, day labor under s pervision of J. N. Gray, W.P.A. project eng Erie. **$16,000.** Boro will purchase materi and equipment to cost $4,968.

Wash., Seattle—King Co. Water Dist constructing water distributing system Angle Lake, south of Seattle, relief lab under $13,777 W.P.A. allotment. **$31,67** Parker & Hill, Smith Tower, engr.

Ont., Port Hope—Municipality constructi pump house, to Anglin Norcross, Ltd., Bloor St. W., Toronto, **$17,402.** Est. $20,0 Noted June 6, CD—June 9, ENR.

SEWERS. WASTE DISPOSAL

PROPOSED WORK

Ala., Linden—City, H. Williams, may plans sewerage system. $34,545. P.W.A. allotted $15,545 grant and $19,000 loan. R. Totten, 405 Title Bldg., Atlanta, Ga., engr

Calif., San Mateo—City. W. D. Soule, mg making plans sanitary sewerage system San Mateo Park. $25,000. P.W.A. will co tribute $20,000 of necessary funds.

Ill., Crystal Lake—City soon takes bid sewage disposal plant, incl. activated sludg with separate sedimentation and sludge digestion equipment, auxiliary piping and appurtenances, etc. $45,000. P.W.A. funds allotted. E. Hancock Eng. Co., 1509 West Jackson Blvd., Chicago, engrs. Noted Ap 19, CD—Apr. 21, ENR.

Ia., Marshalltown—City making plans sew age disposal plant. $75,000-$100,000. Cit engineer, City Hall, engr.

Mich., St. Joseph—City retained Consoer, Townsend & Bryant, engrs., 205 West Wacker Dr., Chicago, Ill., to make preliminary surveys of dual sewerage system which will have to be constructed before sewage disposal plant can be erected. H. G. Crow, city engr

Mo., Braymer—City soon takes bids constructing sanitary sewers in various streets and sewage disposal plant complete with auxiliary equipment, piping and appurtenances, etc. $49,100. P.W.A. allotted $22,09 grant. J. W. Shikles & Co., 708-09 New York Life Bldg., Kansas City, Mo., engrs.

Mo., Carsonville — Carsonville Sewer Dist making surveys sanitary sewerage system for a 850 acre tract to include foul water sewers and sewage disposal plant, etc., in area comprising a strip 1.2 mi. wide on both sides of Carson Rd., between Natural Bridge and St Charles Rds., in St. Louis Co. Petition for incorporation filed in St. Louis County Circuit Court at Clayton (St. Louis, P. O. G. S. Russell, 4903 Delmar Blvd., St. Louis engr.

Mo., Columbia—City voted $225,000 bonds extending sewers. W. B. Cauthorn, city engr Noted June 6, CD.

Mo., King City—See "Waterworks."

★**Mo., Springfield** — City plans southwest sewage disposal addition, incl. sludge system, settling basin, etc., remodeling present building. $500,000. Black & Veatch, 4706 Broadway, Kansas City, Mo., engrs. Noted May 24, CD—May 26; ENR.

N. J., Hackensack—City bids early in July altering and constructing additions to increase flow of 2 existing sewage disposal plants on Hackensack River. $350,000. L. Campbell, City Hall, engr.

N. J., Orange—Town plans 8 in. sanitary sewer in Gist Pl. from North Day to Cleveland Sts. $24,655. Materials will be purchased by town and W.P.A. in ratio of 7 to 1. W.P.A. project. K. Crane, Town Hall town and W.P.A. engr.

N. Y., Canisteo—Village will not construct sewerage system and sewage disposal plant $360,000. Project was defeated at special eleccial election held June 18. Maturity indefinitely postponed. Wm. S. Lozier, Inc., 10 Gibbs St., Rochester, engrs. Noted June 13, CD.

N. Y., Greenburgh (Tarrytown, P. O.)—Town will hold hearing on July 18 for proposed construction of storm and sanitary sewers in 10 streets in Hartsdale Sewer Dist To exceed $25,000.

N. Y., North Tonawanda—City plans sewage disposal plant. To exceed $100,000 Owner will select engineer during week of June 20. Owner to hold public vote for approval. Noted Mar. 9, CD—Mar. 17, ENR

N. Y., Schenectady—City, Dpt. P. Wks., City Hall, plans garbage incinerator, consisting of two 75 ton furnace assemblies, incl stack, roadway and ramps, location probably on Foster Ave. $165,000. P.W.A. allotted $74,250 grant. L. C. Purdy, city engr.

N. Y., Vestal—Village plans sewage disposal plant, near Choconut Creek, north of Front St. (new site). $125,000. Maturity later in 1938. Nussbaymer & Clark, 327 Franklin St., Buffalo, and Security Mutual

Sewers, etc. (Continued)

Life Ins. Bldg., Binghamton, engrs. Noted May 5, CD—May 12, ENR.

N. Y., **Waverly**—Village plans storm sewers, probably using copper and iron pipe. $25,000. Owner will build only if W.P.A. grant is received.

★ N. Y., **Yonkers**—City plans sewerage system. $571,060. P.W.A. allotted $256,977 grant for same. C. Sheridan, city engr. Noted June 24, CD—Apr. 21, ENR.

N. Y., **Yonkers**—City plans constructing additional sanitary sewers. $34,000. P.W.A allotted $15,300 grant. C. Sheridan, engr.

N. C., **Kenly**—Town election July 5, to vote $35,000 bonds for sewers. L. Z. Woodard, mayor.

N. C., **Princeton**—See "Waterworks."

N. C., **Rich Square**—See "Waterworks."

O., **Ashtabula**—City plans storm sewers in 21 streets. To exceed $50,000. Maturity soon.

Ore., **Mt. Angel**—City Council studying report of Baar & Cunningham, engrs., Spalding Bldg., Portland, for new sewage disposal plant. $30,000. May ask W.P.A. for $12,000.

Pa., **Shillington**—Borough plans sanitary sewerage system throughout borough, also plans new reservoir on municipal water-shed to afford better treatment of water and additional storage facilities. To exceed $40,000. Borough Eng. Dpt. compiling preliminary plans and estimates of cost. May seek Federal funds to finance.

Tenn., **Hartsville**—City, M. Hannock, mayor, plans sewers. $41,818. P.W.A. allotted $18,818 grant and $23,000 loan. Freeland Roberts, Life Bldg., Nashville, engr.

Tex., **Burnet**—City voted bonds constructing vitr. clay or concrete sanitary sewer line. $60,000.

Tex., **Lefors**—City, c/o W. C. Breining, mayor, plans complete water and sewerage systems. $76,000. P.W.A. funds allotted. J. E. Ward, Harvey Snider Bldg., Wichita Falls, engr.

Tex., **Pecan Gap**—City, c/o H. T. Shipman, mayor, making plans sanitary sewers in various streets. $26,000. P.W.A. funds allotted. J. Rady, Majestic Bldg., Fort Worth, engr.

Tex., **Pecos**—City, B. A. Toliver, mayor, making plans sanitary sewer extension and sewage treatment plant. $100,000. H. R. F. Helland, c/o Frost Bank Bldg., San Antonio, engr.

★ Tex., **Port Arthur**—City, P. Pilcher, mgr., plans storm drains, sanitary sewers and sewer pumps, waterworks extensions and new equipment; drainage pumps, park improvements, etc. $1,000,000. J. B. Converse & Co., Port Arthur, engrs.

Tex., **Wheeler**—City plans sanitary sewerage system, incl. collecting lines and probably disposal plant. $96,363. P.W.A. allotted $43,363 grant, and $53,000 loan.

★ Wash., **Vancouver**—City plans sanitary sewers. $800,000. P.W.A. funds sought, bond issue necessary. J. L. Henderson, City Hall, engr.

Wash., **Walla Walla**—City plans sanitary sewers, incl. 89,510 ft. 8- to 21-in. pipe. To exceed $66,901. W.P.A. funds sought for labor. City would allot $66,901 for materials, also $2,272 for wye pipe, $6,000 for manholes, $8,100 for brick, $2,560 for cement and $2,000 for GK compound. G. Cookerly, City Hall, engr.

Wis., **Wauwatosa**—City plans laying 7,336 ft. 12- to 54-in. storm sewers in Ridge and Harding Blvds., West Clarke, North 95th, North 94th, North 93rd and West Wright Sts. M. Linnan, Wauwatosa, city engr.

Ont., **Peterborough** — City, comprehension report being made for repairing existing incinerator or building new one. $25,000 to $45,000. R. H. Parsons, Peterborough, engr.

Ont., **St. Thomas**—Municipality making estimates and plans storm sewers in Horton St. W. C. Miller, City Hall, engr.

Ont., **Toronto**—York Twp. making plans extending sewerage system in Lambton Ave. $80,000. O. M. Falls, 40 Jarvis St., comr. Works.

Sask., **Regina Beach**—Municipality making plans extending water distribution system. $25,000. Dpt. P. Wks., Regina, engr.

BIDS ASKED

★ Ill., **Belleville**—City, bids after June 26, sewage treatment plant and sewage lift station. $500,000. Consoer, Townsend & Quinlan, 205 West Wacker Dr., Chicago, engrs.

Ia., **Dallas Center**—July 8, by City, constructing sewage disposal plant, incl. two sewage pumps, one distribution, comminutor, filter stone.

CONTRACTS AWARDED

Conn., **Bridgeport**—City, constructing sanitary sewers in Bryant, Hubbell and Simon Sts., W.P.A. labor. $25,000. P. Brewster, dir. P. Wks.

Ill., **Collinsville**—City, constructing 2 sewage disposal plants complete with auxiliary equipment, piping and appurtenances, one to be on North Side and other on South Side, intercepting sewers, etc., W.P.A. labor. Est.

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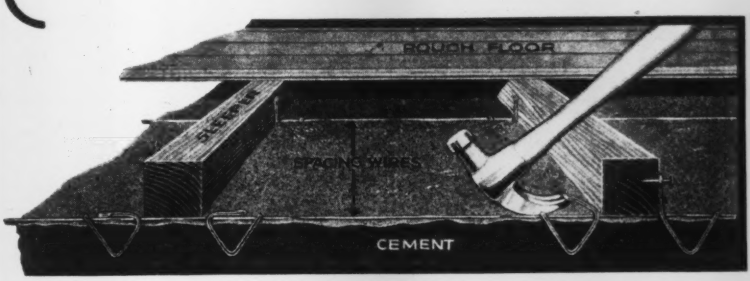

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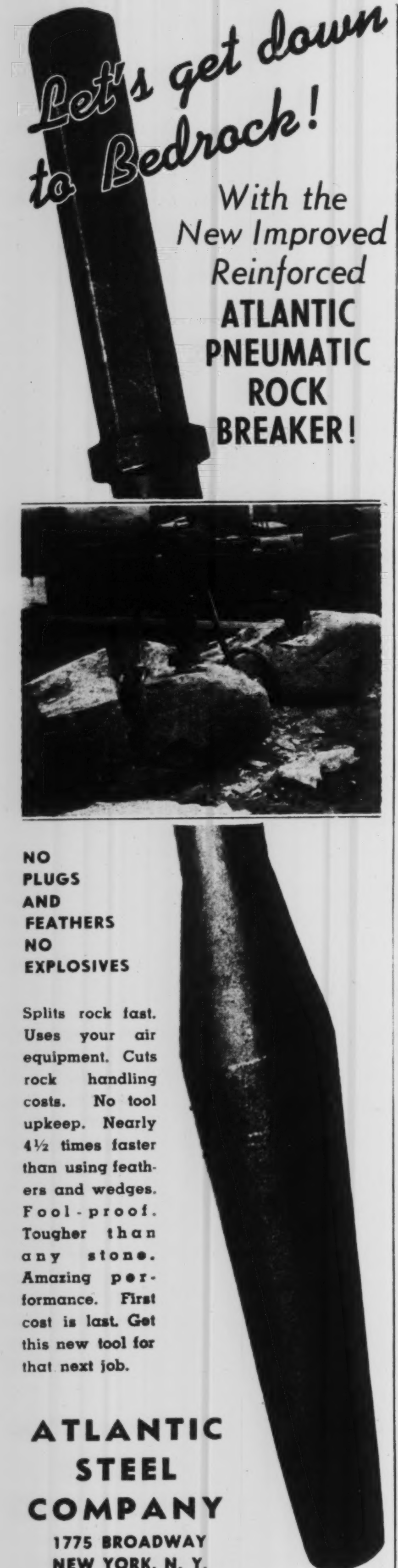
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Sewers, etc. (Continued)

about $220,000. W.P.A. allotted $120,000. Bids about July 8 materials for work above. Caldwell Eng. Co., Imperial Bldg., Jacksonville, engrs. Noted May 4, CD—May 12, ENR.

Ia., Clinton—City, constructing 7,868 ft. 10- to 15-in. D. S. S. G. V. S. sewer in Melrose Court, through Highland Park, Thornburg and Weston Addition, Second Ave., Myra Pl., etc., in Sewer District 4, to Stark Constr. Co., 118 11th St. S.W., Cedar Rapids. $11,369. Est. $14,327. Bids June 3. B. R. Anderson, City Hall, engr. Noted May 20, CD—May 26, ENR.

Mass., Waltham—City, P. Wks. Dpt., H. F. Beal, engr., City Hall, vitr. clay sewer lines in various streets, day labor. $80,000.

Neb., Elgon—City, constructing sewer system, W.P.A. labor. $40,000. W.P.A. allotment approved.

N. Y., Brooklyn—Dpt. P. Wks., 125 Worth St., New York, Contr. 1A, test borings for extension Coney Island Sewage Treatment Works, to Kennedy-Reigger Drilling Co., 30 Church St., New York, $1,690. Bids June 7. Noted May 31, CD—June 2, ENR.

N. Y., Endicott—Village, storm sewers in Dwight Ave. and Jenkins St. and drainage facilities in village park, relief labor. Est. $35,000. C. F. Hunt, Village Hall, engr. Owner's and W.P.A. Engineers supervise and purchase materials. Noted Apr. 21, CD—Apr. 28, ENR.

N. Y., Kauneonga Lake—Kauneonga Lake Sewer Dist., sewers and sewage disposal plant for Kauneonga Lake Sewer Dist. (Town of Bethel), to G. Villa, Westfield, N. J. Est. $40,000. Bids June 11. Noted May 27, CD—June 2, ENR.

N. C., Raleigh—See "Waterworks."

N. C., Spruce Pine — Town constructing sanitary sewers, W.P.A. labor. $20,214. G. W. Coan, Jr., Raleigh, state administrator.

N. C., Wake Forest—See "Waterworks."

O., Akron—City, constructing 24- to 48-in. concrete storm sewers in area bounded by Madison Ave., Wood St., Wick and Fifth Aves., connected with catch basins to be connected with new outlet at Mahoning River which will be tunneled under Spring Common Bridge under 5th Ave., W.P.A. labor, $400,000. A. Haenny, Municipal Bldg., city engr.

O., Green Springs—City, constructing sewage disposal system, W.P.A. labor. $75,956. W.P.A. allotment approved.

O., Painesville—City, constructing sanitary sewers and water lines, W.P.A. labor. $208,648 W.P.A. allotment approved. C. I. Fullerton, city mgr.

Pa., Millcreek Twp.—Millcreek Twp., Erie Co., Erie, P. O., constructing sanitary sewers and manholes in Shorehaven, Beech and Blackstone Drives, Millcreek Twp., day labor. Est. $63,060. Owner will purchase materials to cost $12,829. J. N. Gray, Erie, W.P.A. engr.

★**Tex., Dallas**—City, c/o E. Goforth, secy., sprinkling filters for sewage treatment plant, to Central Contg. Co., Construction Bldg., $518,599; crushed stone, to Southwest Stone Co., Santa Fe Bldg., $187,500. Bids June 3. Noted June 9, CD—June 16, ENR.

Wis., Sheboygan—City, constructing 2,455 ft. 54 in. monolithic concrete sewer in tunnel, to United Constr. Co., Green Bay, $57,635. Bids May 18. Noted May 13, CD.

BRIDGES, GRADE CROSSINGS

PROPOSED WORK

Iowa—State Hy. Comn., Ames, made plans remodeled masonry piers 4 span 608 ft. Primary Rd. 1, in Keosauqua, FA 165, Van Burean Co.; constructing 102x24 ft. continuous I-beam, 40x24 ft. I-beam, 150x24 ft. continuous I-beam, 15x16 ft. timber bridge and 300x24 ft. continuous plate girder on Primary Rd. 100 from Griswold west, FA773, Cass and Pottawatamie Counties, 3 concrete pipe culverts and 2 concrete box culvert extensions, Primary Rd. 331 from Eldridge east to U. S. Rd. 61, Scott Co. F. R. White, Ames, ch. engr.

Iowa—State Hy. Comn., Ames, plans widening 32x18 ft. skew I-beam bridge to 24 ft. roadway, U. S. Rd. 30 east of Grand Mound, FA 147, Clinton Co. F. R. White, ch. engr.

Ia., Cedar Rapids—Linn Co., E. M. Sewell, chn. Bd., plans new bridges. $67,000. P. W. A. allotment approved.

Ia., Fairfield—Jefferson Co., S. Jorgensen, aud., plans bridge and culvert work on secondary roads $44,486. J. J. Stout, co. engr. A three year construction program approved by State Hy. Comn., Ames.

Ia., Nevada—Story Co., B. Dickey, aud., plans bridge and culvert work on secondary roads. $32,570. S. Steigerwalt, co. engr. A three year construction program approved by State Hy. Comn., Ames.

Missouri—State Hy. Comn., Jefferson City. plaans 15 span, 699 ft. bridge over Chicago & Rock Island & Pacific R. R. and Chicago, Burlington & Quincy R. R. tracks, Beverly Junction, Kansas City-Leavenworth Hy. Project WPGH 304C, Route 92, Platte Co. To exceed $25,000.

N. J., Princeton—State Hy. Dpt., Trenton, plans rebuilding bridge over Delaware and Raritan Canal, Mercer Co. $27,500.

N. Y., Canandaigua—Bd. Supervs. Ontario Co., making plans constructing 15 concrete steel bridges in various sections of county. $200,000. G. S. Chester, c/o owner, engr.

N. Y., Elmira—City, Dpt. P. Wks., City Hall, plans bridge Lake St. $271,180. P.W.A. allotted $122,031 grant. Noted Oct. 29, CD—Nov. 4, ENR.

N. Y., Johnstown—City plans steel, concrete bridges. $43,782. P.W.A. allotted $39,537 grant for same.

N. Y., New Rochelle—City and Bd. Supervs. Westchester Co., White Plains, plan steel concrete bridge. $138,720. P.W.A. allotted $62,424 grant for same.

O., Columbus—Bd. Comrs. Franklin Co. plans eliminating C. & O. R. R. grade crossing on Groveport Pike by constructing overhead structure. $70,000. A. C. Slade, Columbus, co. engr.

★**O., Elyria**—Bd. Comrs. Lorain Co. have voted to place bond issue of $797,620 for constructing East Erie Ave. Bridge and $660,520 for 21st St. Bridge on August primary ballot to provide county's share in proposed P.W.A. projects. H. L. Dunham, Elyria, engr.

Texas — State Hy. Comn., R. L. Babbitt, chn., Austin, made plans and soon takes bids constructing Guadalupe River Bridge and approaches, 1.2 mi. long, steel, concrete, on Hy. 123, near Seguin, Guadalupe Co.; constructing T. & N. O. R.R. underpass, approaches and concrete pavement, U. S. Hy. 90, approximately 3 mi. east of Weimer, Colorado Co.; constructing G. C. & S. Fe R.R. overpass and approaches, 0.274 mi. long, steel, concrete, on Adams St., city of Temple, Bell Co.

Texas—State Hy. Comn., R. L. Bobbitt, chn., Austin, plans 2 bridges across Tehuacana and Caney Creeks, on Hy. U.S. 75 between Fairfield and Streetman, Freestone Co.

Tex., Huntsville—Walker Co. plans vehicle bridge, may include also, 2 or 3 small concrete bridge crossings. P.W.A. allotted $55,000 loan and $45,000 grant.

†**Washington**—W. H. Lynch, dist. engr., New Post Office Bldg., Portland, Ore., soon takes bids constructing bridge Spirit Lake outlet St. Helens Hy., Columbia Natl. Forest, Skamania Co., for Dpt. Agriculture, Pub. Roads, Wash., D. C., $25,000.

Ont., Windsor — Essex Co. making plans rein.-con. bridge over Little River. $25,000. W. H. Knister, Courthouse, engr.

Que., Montreal—Municipality making plans subway under Canadian Pacific R.R. tracks at Belgrade Ave. $150,000. J. A. Blanchard, City Hall, dir. P. Wks.

Que., Montreal—Municipality plans subway on Western Ave. connecting Decarie and Prudhomme Aves. $100,000. J. A. Blanchard, City Hall, dir. P. Wks. Contingent upon Government Aid.

Que., Val Brilliant—Municipality plans subway to eliminate level crossing. $88,500. Money voted.

BIDS ASKED

California—July 14, by C. H. Purcell, engr., at 808 State Bldg., Los Angeles, extension to existing bridge on Ave. 60 over Arroyo Seco Parkway, Los Angeles Co., involving 11,500 cu. yd. excav., etc., to exceed $25,000; replacing destroyed bridge with 8 span 40 ft., rein.-con. girder bridge over Santa Ana River, 1 mi. east of Colton, San Bernardino Co., to exceed $25,000; replacing bridge with 3 span 189 ft. rein.-con girder bridge over Santiago Creek on State Hy., Orange Co. $40,000.

California—July 13, by C. H. Purcell, engr., State Hy. Dpt., P. Wks. Bldg., Sacramento, constructing bridge consisting of through steel truss span with timber stringer approach spans and concrete decks over San Joaquin River, 4 mi. northeast of Auberry, Fresno and Madera Counties, involving 10 cu. yd. excav., 40,000 lb. bar reinforcing steel, 315 cu. yd. "A" concrete, 192,000 lb. structural steel, 2,200 lb. cast steel, 15 MFBM treated Douglas fir timber; 522 lin. ft. timber railing, etc.

California—See "Roads."

Calif., Oakland—July 12, by Clerk Alameda Co., Oakland, constructing rein.-con. bridge over Crow Creek, grading 1 mi. Crow Canyon Rd., involving 26,500 cu. yd. roadway excav., 1,050 cu. yd. structural excav., 5,370 tons tons crusher run base, 720 cu. yd. "A" conchrete structures, 126,000 lb. reinforcing steel, 900 lin. ft. 12- to 36-in. corrugated metal pipe. $50,000 or more.

Calif., San Francisco—J. Skeggs, dist. engr., State Hy. Comn., State Bldg., taking bids constructing pedestrian subway extension, involving in the main grading, 602 tons crusher run base, 3.5 tons liquid asphalt 90-95; 104 tons screenings, 204 cu. yds. "A" concrete, 27,700 bl. bar reinforcing steel, etc., near San Francisco Co. line.

★**Fla., Jacksonville**—July 12, by State Road Dpt., Tallahassee, constructing 1,815 ft. bridge comprising one 365 ft. steel truss vertical lift span, two 239 ft. steel truss approach spans and 3 continuous plate girder approach spans with lengths of 101 ft., 149 ft. and 101 ft. all on concrete piers, and six 49 ft. and eight 35 ft. approach spans on pil-

Bridges, etc. (Continued)

bents over St. Johns River. Bids on Part 1, consisting of 7 concrete piers for steel truss vertical lift span, 2 steel truss approach spans, and 3 continuous plate girder approach spans, etc., total length of part 1, 1,237 ft. Bids on 2 alternates, (A) constructing Piers 2 and 3 (for the vertical lift span) by the Pneumatic Caisson Method and Piers 1, 4, 5, 6 and 7 (for the approach spans) by open cofferdam method. Alternate (B) constructing all piers by the Pneumatic Caisson Method. Bids may be submitted on either or both alternates. $1,400,000. J. H. Dowlnig, state hy. engr. Noted Apr. 1. CD—Apr. 7, ENR.

Iowa—July 6, by State Hy. Comn., Ames, constructing 16 concrete pipe culverts and extensions and 14 concrete box culverts and extensions, P. R. 10 from U. S. Rd. 75 west to P. R. 231, Sioux Co.; 3 concrete pipe culverts and 2 concrete box culvert extensions, P. R. Rd. 331 from Eldredge east to U. S. Rd. 61, Scott Co.; 1 combination rein.-con. pipe and box culverts U. S. Rds. 65 and 69, north of Polk Co. Farm, Polk Co.; 1 rein.-con. pipe culvert U. S. Rd. 169, north of Winterset, Madison Co.; 14 concrete box culvelts and extensions and 4 concrete pipe culverts, 50x24 ft. I-beam bridge on remodeled abutements Primary Rd. 9 from Lester east to U. S. Rd. 74, Lyon Co.; raising and resurfacing 174x24 ft. multiple span I-beam overhead bridge, P. R. 64 west of Preston at C. M. St. P. & P. R.R., Jackson Co.; constructing 150x24 ft. continuous I-beam bridge, P. R. 346 northeast of Nashua, Chickasaw Co.; 450x32 ft. continuous plate girder bridge U. S. Rd. 20, in Manchester, Delaware Co.; 10 concrete pipe culverts and extensions, 19 concrete box culverts and extensions and 2 concrete arch culverts, P. R. 100 from Griswold west, Cass and Pottawattamie Counties; 1 rein.-con. box culvert and 0.075 mi. grading, graveling P. R. Rd. 326 south of Bristow, Butler Co.

Kentucky—See "Roads."

†La., New Orleans—July 18, by U.S. Eng., 2nd New Orleans Dist., constructing creosoted pile, timber highway trestle across Catahoula Lake at St. Anthony Church, St. Martin.

Maryland—July 5, by State Roads Comn., Baltimore, reconditioning electrical equipment for existing bridge over Sassafras River, between Cecilton and Galena, incl. repairs, adjustments and replacements of operating equipment for bascule span, light, power and control wiring, safety gates, etc., Contr. K-103-1-211, Kent Co.; reconstructing open steel floor on existing double leaf bascule bridge over Wicomico River, Main St., in Salisbury, existing bridge provides 40 ft. channel and 20 ft. roadway, incl. removal of old floor, constructing new floor, supports, painting, etc., Contr. Wi-166-11, Wicomico Co.

New York—July 14, by Triborough Bridge Authority, Administration Bldg., Randalls Island, P. Loeser, dir., top soil and soil mulch from Bronx-Whitestone Bridge to Northern Blvd. on Queens Approach to Bronx-Whitestone Bridge, Contr. WB-12. Madigan-Hyland, 28-04 41st Ave., Long Island City, consult. engrs.; adv. ENR June 30.

New York—July 21, by Triborough Bridge Authority, Administration Bldg., Randall's Island, P. Loeser, dir., planting from Bronx-Whitestone Bridge to Northern Blvd. on Queens Approach to Bronx-Whitestone Bridge, Contr. WB-13. Madigan-Hyland, 28-04 41st Ave., Long Island City, consult. engrs.; adv. ENR June 30.

New York—July 8, by Triborough Bridge Authority, Administration Bldg., Randall's Island, transporting topsoil and soil mulch from Eastern Blvd. on Bronx Approach to Bronx-Whitestone Bridge in Bronx Boro, Contr. WB-36. Madigan-Hyland, 28-04 41st Ave., Long Island City, consult. engrs. P. Loeser, dir.

New York—July 14, by Triborough Bridge Authority, Administration Bldg., Randall's Island, P. Loeser, dir., planting from Eastern Blvd. on Bronx Approach to Bronx-Whitestone Bridge, Bronx Boro, Contr. WB-37. Madigan-Hyland, 28-04 41st Ave., Long Island City, consult. engrs.

N. Y., New York—July 8, by President Bronx Boro, Bronx County Bldg., East 161st St. and Grand Concourse, constructing bridge carrying New York Central R.R. over Major William F. Deegan Blvd. at Park Ave., Exterior St. and Major William F. Deegan Blvd. and constructing roadways between N. Y. C. RR right-of-way-lines, involving 14,000 cu. yd. common excav., 100 cu. yd. common excavation in water, 350 cu. yd. rock excav., 20 cu. yd. rock excav. in water. $330,000.

Tennessee—See "Roads."

West Virginia—July 6, by State Rd. Comn., Charleston, constructing Troy Bridge 1445, two 30 ft. and one 50 ft. steel I-beam spans on concrete substructure also grading, draining approaches, S.P. 3364-C, Gilmer Co.; Cluster Bridge 1479, two 53 ft. and one 65 ft. steel I-beam spans on concrete substructure also grading and draining approaches, S.P. 3449-C Hancock Co. M. R. Hamill, secy.

Wisconsin—July 12, by State Hy. Comn., Madison, constructing Bridge 472, three 22 ft. spans concrete steel and timber trestle, and Culvert 1303, one 20 ft. span concrete, steel, timber trestle, Contr. 2, Browntown-Jordan

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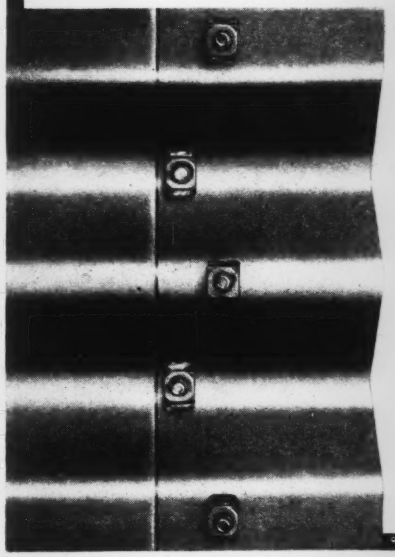

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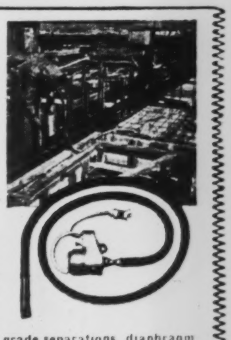

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Bridges, etc. (Continued)

Rd., C. T. Hy. M, FAS 18-A, Green Co., 280 cu. yd. excav.; Bridge 512, two 21 ft. spans, concrete, steel, timber trestle, 2 concrete box culverts, Bridge 458, substructures, two 93 ft. spans, continuous low truss, Contr. 2, Green Valley-Gillett Rd. S.T. Hy. 32, S.P. 3718, Oconto Co.; constructing one 20 ft. slab span culvert extension, one 12 ft. slab span culvert, one 10 ft. slab span culvert, one 7.9 ft. slab span culvert extension, one 8x5 ft. box culvert, three 3½ ft. x 6 ft. box culverts Kiel-Cleveland Rd., Kiel-County Trunk Hy. "A" Rd., S.T. Hy. 32 and 149 S.P. 3755, Manitowoc Co.: Bridge 411, timber trestle, three 25 ft. spans. Cable-Grandview Rd. Namekagon River Bridge, C.T. Hy. "D", FAS 8 A, Bayfield Co.; plate girder underpass, Milwaukee-Plymouth-Green Bay Rd., Tillman Subway Sect., S.T. Hy. 57, FAGH 458 1, Ozaukee Co.

LOW BIDDERS

★**N. Y., Long Island City**—New York City Parkway Authority, Arsenal Bldg., Central Park, 5th Ave. and 64th St., New York, June 21, widening viaduct and constructing bascule substructure on Cross Bay Parkway, Contr. 3, Queens Boro, from Johnson, Drake & Piper, Old Country Rd., Freeport, $1,665,389. Noted June 7, CD—June 9, ENR.

★**Texas** — State Hy. Comn., R. L. Babbitt, chn., Austin, June 21, constructing Red River Bridge and adjacent roadway approaches, 28 spans, 1.322 mi. long, substructure to be reinforced spread footing type piers and abutments on precast concrete piling, superstructure steel, concrete, Hy. 128 between Wilbarger Co., Tex., and Tillman Co., Okla., from Forcum James Co., Dyersburg, Tenn., $565,671. Est. $570,000. Bids June 21. Noted June 13, CD—June 16, ENR.

CONTRACTS AWARDED

California—C. H. Purcell, engr. State Hy. Dpt., P. Wks. Bldg., Sacramento, rein.-con. bridge and grading, applying seal coat on 0.2 mi. roadbed at Dry Creek, east of Marysville, Yuba Co., to Valley Constr. Co., 47 West Santa Clara Ave., San Jose, **$49,744**. Bids June 15. Noted June 1, CD.

Florida—See "Roads."

★**Fla., De Funiak—Walton Co.** Bridge Authority, constructing Choctawhatchee Bay Bridge, 17,000 ft. long, composed of steel girder spans with concrete deck, involving 9,000 yd. hydraulic embankment, Contr. A, bridge structure and navigation span, Contr. B, hydraulic embankment and asphalt paving, to Shell Producers Co., 115 South Water St., Tampa, **$402,619** and **$165,851** respectively. Waiting P.W.A. funds, available soon. Noted Apr. 26, CD—Apr. 28, ENR.

Ill., Salem—Marion Co., c/o Supt. Co., Hy. Dpt., constructing 2 spans 38 ft., incl. one span 49 ft. WF beam bridge on creosoted pile bents on Sect. 17B, MFT, to M. C. Merrills, Belleville **$8,061**. Bids June 10. Noted

Indiana—State Hy. Comn., Indianapolis, one 30 ft. and two 50 ft. span rein.-con. girder bridges over Sallust and McHaffie Branches, Putnam Co., to B. E. Curry-Building Corp. 306½ West 6th St., Bloomington, **$38,869**, est. $45,754; 2 span, 145 ft. continuous steel beam bridge over Mill Creek, Hendricks Co., to R. H. King, Danville, **$54,819**, est. $59,783; new handrails, sidewalks on present 9 span 409 ft. steel girder bridge over St. Joseph River, St. Joseph Co., to C. D. Smelzer Constr. Co., South Bend, **$17,728**, est. $26,333. Grand total $111,416. Bids June 7, awarded June 20. Noted May 24, CD—May 26, ENR.

★**Indiana**—State Hy. Comn., Indianapolis, 2 span 75 ft. simple steel beam and 2 span 139 ft. continuous steel beam bridge over Crooked Creek, Spencer Co., also 2 span 50 ft. simple steel beam and 9 span 487 ft. continuous steel beam bridge over Dry Run Creek, northeast of Leavenworth, to A. G. Ryan & Sons, Furniture Bldg., Evansville, **$33,948** and **$105,783** respectively est. $37,360 and $119,781 respectively***3 span 180 ft. rein.-con. arch and 2 span 131 ft. steel girder bridge over Big Eagle Creek and under C.C.C. & St. L. Ry., Marion Co., to Smith & Johnson, 1799 Kentucky Ave., Indianapolis, **$289,574** est. $313,708***one 35 ft. rein.-con arch bridge over Little Calumet River, Lake Co., to P. J. Messer Constr. Co., 9942 South Levitt St., Chicago, Ill., **$60,847** est. $68,249***one span 28 ft. and one span 24 ft. rein.-con. girder bridges over Silverville Creek, Lawrence Co., to Foulkes Contg. Co., 705½ Ohio St., Terre Haute, **$13,853** est. $14,661***one span 50 ft. steel beam bridge, rein.-con. substructure over Prairie Creek, Davies Co., to Ryan & Ryan, Inc., Washington, **$15,992** est. $18,624. Grand total $519,997. Bids June 7, awarded June 21—not yet signed. Noted May 24, CD—May 26, ENR.

Iowa—State Hy. Comn., Ames, constructing 2 concrete box culverts Hamilton Co., to P. B. Reis, Des Moines, **$5,166**; 81 ft. 4 in. 24 ft. multiple span I-beam bridge, 15x20 ft. timber bridge mover and re-erecting old 50x16 ft. truss bridge 210x24 ft. continuous I-beam bridge, 1 concrete box culvert extension and 2 concrete pipe culverts, to A. Olson Constr. Co., Waterloo, **$34,982**. Bids June 21. Noted June 13, DC—June 16, ENR.

Louisiana—State Hy. Comn., Baton Rouge, L. P. Abernathy, chn., H. B. Henderlite, state hy. engr., constructing Metairie Relief Canal Bridge on Airline Hy., Orleans Parish, Route C-1500, to Forcum-James Co., Dyersburg, Tenn., **$63,931**. Bids June 15. Noted May 26, CD—June 2, ENR.

North Carolina—July 6, by State Hy. & Pub. Wks. Comn., Raleigh, bridge and approaches over Gum Swamp between Hamlet and Laurinburg, Project 6790, Scotland Co. To exceed $40,000. W. V. Baise, Raleigh engr. Noted June 3, CD—June 9, ENR.

N. C., Spray—State Hy. & Pub. Works Comn., Raleigh, constructing bridge over Smith River, state forces. To exceed $15,000 W. L. Craven, Raleigh, bridge engr.

Oklahoma—State Hy. Dpt., Oklahoma City, 8 span 280 ft. continuous I-beam span bridge, concrete piers, at Marietta, Love Co., to R. R. Tway, 710 East 19th St., Oklahoma City, **$25,461** est. $29,193***3 span continuous I-beam span bridge, concrete piers at Kelleyville, Creek Co., to Gaines Bros., Miami, **$33,598** est. $37,172. Bids June 21. Noted June 8, ENR.

Wisconsin—State Hy. Comn., Madison, constructing superstructure bridge 483, Taylor Co., to A. A. Prendergast & Associates, 305 Fourth Ave. S., Minneapolis, Minn., $18,184***Culvert 1241 and substructure for Bridge 457, Manitowoc Co., to H. B. Janke, Fredonia **$11,574*****structures Dunn Co., to Albert Beckman & Co., Lake City, Minn., **$18,867**. Grand total $48,445. Bids June 21. Noted June 2, CD—June 9, ENR.

N. S., Antigonish—Dpt. Hys., Halifax, constructing abutments Whiddens Bridge, to Hector MacNeil, 7 Richard St., Sydney Mines **$40,000**. Bids May 3. Noted Apr. 28, CD under "Halifax."

Que., Rouyn—Dpt. P. Wks., Quebec City constructing bridge over Kinogevis River, to Hull Constr. Co., 187 Main St., Hull Est. **$150,000**. Bids June 13. Noted June 6, CD—June 7, ENR.

STREETS AND ROADS

BIDS ASKED

Ariz., Safford—Town Council taking bids paving approximately 9 mi. city streets $213,000. P.W.A. project. P.W.A. granted $120,707. Town furnished rest.

California—July 13, by C. H. Purcell, engr. State Hy. Dpt., P. Wks. Bldg., Sacramento, grading, constructing soil cement and crusher run base, plant mix surfacing, constructing 2 rein.-con. slab bridges 8 mi. hy. between Muir and Willow Pass, Contra Costa Co.

Calif., Independence—July 8, by D. Matthew, clk. Inyo Co., furnishing, delivering spreading 45,000 gals. SC-3 road oil temp. 180 degrees F., on streets of Lone Pine in Road Dist. 4.

Calif., Stockton—City Council, taking bids improving Ophir St., involving 112,489 sq. ft. scarifying and reshaping pavement, 703 tons gravel binder material base, 17 tons 90-95 road oil, prime coat, 27 tons bituminous binder, seal coat, 438 tons rock screenings.

Illinois—July 8, by State Dpt. P. Wks. & Buildings, Div. Hys., Springfield, grading 4.56 mi. Jersey and Madison Counties; 1.4 mi. FAP FA Route 12 Sect. F2 A, Dist. 8, Madison Co.; crushed stone surface course or crushed stone surface course novaculite gravel on 3.88 mi. FAS 5393 S.A. Route 7 and 17, Sect. 27G1, Dist. 9, Franklin Co.; 3.36 mi. FAS 518 C, S.A. Route 15A, Sect. 28 A, Dist. 6, Fulton Co.; constructing rein.-con. girder bridge and paved approaches State Route 6, Sect. 30B, Dist. 2, Lee Co.; I-beam bridge reconstruction, State Route 8, Sect. 7R B, Dist. 4, Henderson Co.; concrete paving approaches to Illinois R. bridge, 0.18 mi. FAP 259C, Route 90, Sect. 1, Dist. 3, Marshall Co.; two I-beam bridges FAP 389C and 389D FA, Route 141, Sect. 111B and 112B, Dist. 2, Lee Co.; I-beam bridge FAS 581C, Route 15B, Sect. 28 B, Dist. 4, Fulton Co.

Ind., Rockport—July 22, by Spencer Co. Bridge Comn., constructing 13,000 ft. earth embankment, consisting of about 225,000 cu. yd. excav. for bridge approach. G. Scamahorn, secy. Hunt & Hunt, Fredericktown, Mo., engrs.; adv. ENR June 30.

Iowa—July 6, by State Hy. Comn., paving 0.167 mi. U. S. Rd. 20 in Manchester, FA 4-2, Delaware Co., 6,699 cu. yd. unclassified excav.; grading, paving 7.271 mi. Primary Rd. 9 from Lester east to U. S. Rd. 75 110, Lyon Co., 281,772 cu. yd. excav.; 0.416 mi. U. S. Rds. 65 and 89 north of Polk Co. Farm, Polk Co., 22,500 cu. yd. excav.; 7.042 mi. Primary Rd. 10 from U. S. Rd. 75 west of Primary Rd. 231, Sioux Co., 233,941 cu. yd. excav., grading 8.513 mi. Primary Rd. 100 from Griswold West, Cass and Pottawattomie Counties, 466,580 cu. yd. excav.; rolled stone or stabilized base course and bituminous surfacing 2.091 mi. Primary Rd. 278 from Primary Rd. 60 northwest into Rathbun Appanoose Co.; 1.842 mi. Primary Rd. 266 from U. S. Rd. 69 east into Weldon, Clarke and Decatur Counties; stabilized base and bituminous surfacing 0.219 mi. Primary Rd. 83 south of Walnut, Pottawattomie Co.; grading, rolled stone or stabilized base course and bituminous surfacing 1.737 mi. Primary Rd. 331 out of Eldridge east to U. S. Rd. 61, Scott Co., 22,144 cu. yd. excav.; stabilized base course and bituminous surfacing 4.75 mi. Primary Rd. 37 Shelby Co. 2nd course bituminous surfacing 6.681 mi. Primary Rd. 49 from U. S. Rd. 34 south to Lenox, Adams and Taylor Counties; 7.829 mi. Primary Rd. 148 from Bedford southwest to

Streets and Roads (Continued)

Missouri State line, Taylor Co.; 10.294 mi. U. S. Rd. 59 from Imogene north to U. S. Rd. 34, Fremont and Mills Counties; 0.381 mi. Primary Rd. 212 from Iowa Co. line north, Benton Co.; 11.241 mi. Primary Rd. 24 from Guthrie Center south to U. S. Rd. 6, Guthrie Co.; 12.412 mi. Primary Rd. 242 from Benton Co. line southeast to Marengo, Iowa Co.; stabilized base course and bituminous surfacing 6.126 mi. and second course bituminous surfacing 12.185 mi. U. S. 59 from Oakland to Avoca, Pottawattamie Co.; furnishing 500 cu. yd. cover aggregate on Primary Rd. 172 from Clermont to Elgin, Fayette Co.; furnishing 1,000 cu. yd. aggregate on Primary Rd. 11 from West Union to Calmar, Fayette Co.; maintenance bituminous surfacing P.R. 1 from Iowa City to West Branch, Cedar and Johnson Counties. F. R. White, Ames, ch. engr.

Kentucky—July 15, by Dpt. Hys., Frankfort, grading, draining low type surfacing 8.533 mi. FAS 385 A-GS, Boone Co., 6.95 mi. FAS 268 D-GS, Elliott Co.; 1.887 mi. FAS 25 A-GS, Marshall Co., 6 mi. S.P. 23, Adair Co. (excluding bridge and approaches at Green River); 4.8 mi. S.P. 930, Alen Co.; 8.9 mi. S.P. 246, Crittenden Co.; 13.59 mi. S.P. 632, Fulton Co.; 2.4 mi. S.P. 1377 and 2.869 mi. S.P. 514, Hichman Co.; 5.8 mi. S.P. 1076, Logan Co.; 7.44 mi S.P. 41½, Taylor Co.; 2.463 mi. FR A-GS, Letcher Co.; low type surfacing 5.74 mi. and grading, draining, low type surfacing 3.734 mi. FAS 354 AS & FAS 413 ABGS, Hopkins Co.; low type surfacing 2.957 mi. FAS B-S, Oldham Co.; 6.405 mi. FAS 8 B-S, Warren Co.; grading, draining and low type surfacing 6.282 (separate bids for steel superstructure for bridge containing six 50 ft., two 55 ft. and one 80 ft. I-beams, over Drake's Creek) on FA 228 D-GS, Warren Co.; high type surfacing 1.029 mi. FA 375 B-S, Boyd Co.; medium type surfacing 2.612 mi. S.P. 116 A-S, McCracken Co.; bituminous surfacing 3.5 mi. S.P. 46, Bullitt Co.; seven 33 ft. rein.-con. deck girder and one 80 ft. steel plate girder span bridge on S.P. 100, Powell Co.; bituminous surfacing 3.5 mi. S.P. 46, Bullitt Co.; low type surfacing 5.278 mi. FAS 3-A-S, Green Co.

Louisiana—July 20, by State Hy. Comn., Baton Rouge, grading, surfacing 4.673 mi. Sugartown-Smyrna Church Hy., Project 815-B, Route 467; Federal Aid Secondary Project FAS 9-(1), Beauregard Parish; grading, drainage structures, 12.366 mi. Intersection Route 264-Sheridan Hy., Route C-1548, State Project 1280, Washington Parish. H. B Henderlite, state hy. engr., L. P. Abernathy, chn. State Hy. Comn.

Maine—July 6, by State Hy. Comn., L. D. Barrows, ch. engr., Augusta, gravel surfacing 0.61 mi. F.A.P. FAS 211-C, Sebago; 0.76 mi. F.A.P. FAS 236-E, Dixmount; 1.18 mi. F.A.P. FAS 15-A, Otisfield and FAS 324-C, Waterford. To exceed $60,000.

Maryland—July 5, by State Roads Comn., Baltimore, delivering and laying bituminous surface course Spec. C, (1,100 tons), along 0.3 mi. Main St. in Frostburg, Contr. A-251-1-611; 3,800 tons same along 1.24 mi. Green St. in Cumberland from Dingle Circle to Washington St., Contr. A-251-1-611, both Alleghany Co.; 3,400 tons along 2.1 mi. National Pike, Route 40, between Clearspring and Conochea-Conococheague, Contr. W-289-1-611, Washington Co.; concrete paving 0.23 mi. National Pike, between Hagerstown and Boonsboro at Death Curve, Contr. W-171-4-611, Washington Co.

Minnesota—July 8, by State Hy. Dpt., St. Paul, grading, stabilized base and bituminous surfacing 4 mi. S.P. 13-117-21-2 and 101-187-22-3, FAP 651A (2) and 561C (1), incl. 366,743 cu. yd. excav.; 6.7 mi. S.P. 59-17-30-2 FAP 75 (8), 1,163 cu yd. subgrade excav., 1,396 cu. yd. gravel backfill, 16,292 tons gravel base, 3,889 cu. yd. binder soil and 37,920 gal. bituminous prime coat; 6.7 mi. S.P. 59-17-30-2, FAP 75 (8), 153,680 gal. bituminous material and 7,701 tons gravel aggregate.

Mo., Kirksville—City soon takes bids concrete paving, grading, curbing, guttering, etc. 20 mi. various streets. $365,000. P.W.A. allotted $204,545. Capital Eng. Co., 620 Jefferson St., Jefferson City, engrs. R. N. Howell, city clk.

Nevada—July 7, by R. A. Allen, engr. State Hy. Dpt., Carson City, grading, surfacing 7.2 mi. Route 1 Sects C1 and C2 between west foot of Golconda Summit and east foot of Golconda Summit, Humboldt Co.

N. J., Plainsboro — July 6, by Plainsboro Twp. Com., improving 11.854 sq. yd. Dey Rd. Sects. 2 and 3, Middlesex Co. A. D. Bullock, 108 Frazier St., Trenton, engr.

N. Y., New York—July 6, by President Bronx Boro, Bronx County Bldg., East 161st St. and Grand Concourse, regulating, grading, setting curb, laying sidewalks and crosswalks, removing and replacing trees, building inlets, receiving basins, drains, culverts, approaches and guard rails where necessary in, and sheet asphalt paving Elsmere Pl. from Crotona Parkway to Daly Ave.; regulating, grading, curbing, laying sidewalks, and crosswalks, removing and replacing trees, building inlets, receiving basins, drains, culverts, approaches, guard rails, Oliver Pl. from Decatur Ave. to Webster Ave.; brick paving West 230th St. from Bailey to Heath Aves.; furnishing, delivering bluestone curb, and granite headers, rented equipment, in connection with above; furnishing, delivering c.i. frames and gratings

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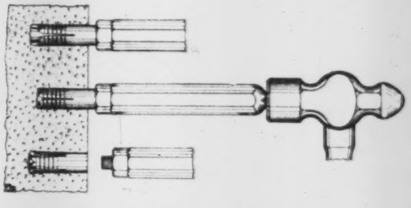
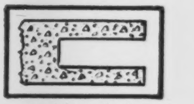
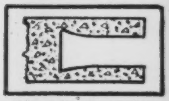


Center—drilling hole
Top—expanding shell
Bottom—expansion completed



Straight hole for ordinary shell



Hole enlarged at inner end for Phillips Shell

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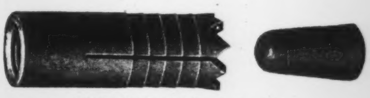

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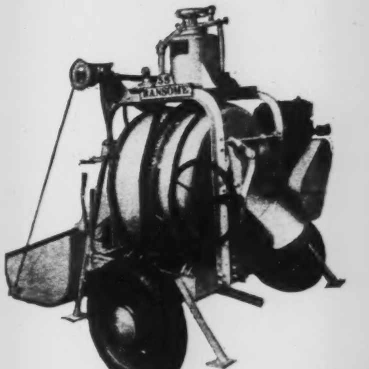

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Streets and Roads (Continued)

and hoods, wrought iron hooks and steps in connection with sheet asphalt paving East 181st St. from Grand Blvd. and Concourse to Ryer Ave.

N. Y., Syracuse—Bd. Contr. & Purchase, City Hall, taking bids bituminous paving portion of Salina St. To exceed $25,000.

†Oregon—July 7, by Pub. Roads, Portland, constructing and improving 1.579 mi. Santiam Hy. in Willamette Natl. Forest, Linn Co., 272,500 cu. yd. unclassified excav., etc.

Tennessee—July 8, by State Hy. Dpt., Nashville, grading, draining, paving 1.376 mi. State Hy. 71, Sevier Co.; paving 0.852 mi. approaches to Obion River (Middle Fork) Bridge on Route 43, Weakley Co.; constructing bridge and approaches over Duck River on Santa Fe Pike, Maury Co.

†Virginia—July 12, by Pub. Roads, 1725 F St. N. W., Wash., D. C., constructing road mix bituminous surface course 17.391 mi. Shenandoah Natl. Park, Rockingham, Greene and Albemarle Counties. H. J. Spelman, dist. engr.; adv. ENR June 30.

†Washington—July 12, by Bureau Roads, New Post Office Bldg., Portland, Ore., grading 6.818 mi. Mt. Adams Hy., Columbia Natl. Forest, Klickitat Co.

West Virginia—July 6, by State Rd. Comn., Charleston, grading, draining, macadam base and road mix surfacing 0.188 mi. Seng Creek Bridge approaches, S.P. 3205, Boone Co.; grading, draining, stone base and asphaltic concrete surfacing 0.432 mi. Shepherdstown Bridge approach, S.P. 3217-A, Jefferson Co.; grading, draining, concrete paving Simmons Rd., FAP 215-1, Mercer Co., and 1.946 mi. Maybeury-Mercer County line Rd., McDowell Co.; reconstructing base surface treatment and bridge on 4.925 mi. Greenville to Raines Corner Secondary Rd., FASP 10-A, Monroe Co.; reconstructing base, macadam base and surface treating 4 mi. Ghent-Odd Secondary Rd., S.P. 5292, Raleigh Co.; grading, draining, concrete paving stone base and road mix surfacing 0.883 mi. Fetterman Overhead approaches, FAP 2-A (4), Taylor Co. M. R. Hamill, secy.

Wisconsin—July 12, by State Hy. Comn., Madison, grading, draining, concrete surfacing 0.736 mi. Beaver Dam-Waupun Rd., Rhode Curve Rd., U. S. Hy. 151, S.P. 1661, Dodge Co., 11,525 cu. yd. excav.; 0.8 mi. Barron-Turtle Lake-St. Croix Falls Rd., Division St., city of Barron, U. S. Hy. 8, S.P. 8584, Barron Co., 2,953 cu. yd. unclassified excav.; 1.669 mi. Marshfield-Stevens Point-Waupaca Rd., Stevens Point-Junction City Rd., U. S. Hy. 10, FAP 128, Portage Co., 1,715 cu. yd. common excav.; grading, draining, culverts, concrete surfacing 5.324 mi. Milwaukee-Chicago Rd., Milwaukee Co. line-Kilbourn Country Club Sect., U. S. Hy. 4, FAP 238 and 361 A, Racine Co., 51,281 cu. yd. excav.; 0.05 mi. Walworth-Lake Geneva-Milwaukee Rd., Waterford Beidge, S.T. Hy. 36, S.P. 2352, Racine Co.; concrete surfacing 3.892 mi. Barron-Turtle Lake-St. Croix Falls Rd., Turtle Lake-Almena Rd., U. S. Hy. 8, FAP 408B, Contr. 1, Barron Co., 2,163 cu. yd. unclassified excav.; grading, draining 1.336 mi. Browntown-Jordan Rd., C.T. Hy. M, FAP FAS 18A, Green Co., 1,695 cu. yd. common excav.; 7.164 mi. Green Valley-Gillett Rd., S.T. Hy. 32, S.P. 3718 Contr. 1, Oconto Co., 141,188 cu. yd. excav.; 6.272 mi. Kiel-Cleveland Rd., Kiel-County Trunk Hy. A Rd., S.T. Hy. 32 and 149, S.P. 3755, Manitowoc Co., 201,605 cu. yd. excav.; 1.24 mi. Keyes Lake-Florence Rd., S.T. Hy. 101, S.P. 7093, Florence Co., 20,604 cu. yd. excav.; 1.325 mi. Keshena-Langlade Rd., S.H. Hy. 55 and 64, S.P. 7094, Langlade Co., 78,191 cu. yd. excav.; 3.996 mi. St. Croix Falls-Superior Rd., Danbury-North County Line Rd., S.T. Hy. 35, S.P. 8643, Burnett Co., 54,029 cu. yd. unclassified excav.; grading, draining gravel or crushed stone surfacing 1.637 mi. McHenry-Elkhorn-Madison Rd., Como Relocation Rd., U. S. Hy. 12, FAP 502 G, Walworth Co., 196,658 cu. yd. excav.; 2.557 mi. Osseo-Cadott Rd., S. T. 27, S.P. 6420 and 5659, Eau Claire and Trempealeau Counties, 101,621 cu. yd. excav.; 9.516 mi. Dubuque-Platteville Rd., Dickeyville-Platteville Sect. U. S. Hy. 151, FAP 100 and 451D, Grant Co., 167,155 cu. yd. excav.; grading, draining, bridge and mine tailing surfacing 0.41 mi. Montfort-Highland Rd., County Line bridge and approaches, C.T. Hy. 1, Grant and Iowa Counties, 8,062 cu. yd. excav.; graveling 14.728 mi. Port Washington-Manitowoc Rd., South County Line-Manitowoc Rd., Manitowoc Co., 14.12 mi. Superior-Bayfield Rd., Parkland-East County Line Rd., S.T. Hy. 13, S.P. 8661, Douglas Co.; bituminous paving 0.705 mi. South Chase Ave. Rd., South Chase Subway Rd., Milwaukee Co.

CONTRACTS AWARDED

California—C. H. Purcell, engr., State Hy. Dpt., 808 State Bldg., Los Angeles, grading, asphaltic concrete surfacing 1.2 mi. state hy. near Gallvan, Orange Co., to V. R. Dennis Constr. Co., 3911-5th Ave., San Diego, **$52,997.** Est. exceeds $25,000. Bids June 9. Noted May 31, CD.

California—C. H. Purcell, engr., State Hy. Dpt., P. Wks. Bldg., Sacramento, gravel and plant mix surfacing 5.9 mi. hy., Calaveras Co., to Piazza & Huntley, 194 North 6th St., San Jose, **$54,072.** Bids June 15. Noted June 1, CD.

Calif., Oakland—See "Unclassified."

★ **Calif., San Francisco**—City [illegible] asst. city engr., City Hall, st[illegible] constructing roads and paths [illegible] and general park improvements [illegible] **W.P.A.** granted **$5,729,301** to fi[illegible]

Calif., San Francisco—Dpt. P[illegible]ks., City Hall, concrete and asphaltic con[illegible] paving, concrete curbs, walks, etc., 1[illegible] Ave. between Lincoln Way and Law[illegible] Sts., to C. L. Harney, Call Bldg., $1[illegible]45. Bids June 15. Noted June 9, CD.

Calif., San Francisco — Pu[illegible] Utilities Comn., City Hall, repaving str[illegible] and sidewalk openings for San Francisco [illegible] Dept. during fiscal year ending June [illegible] 1939, to Pacific Pavements Co. Ltd., 85 [illegible]stow St., **$37,185.** (**Correction**—Location [illegible] project.) Bids June 9. Noted June 17, C[illegible]—June 23, ENR.

★ **Florida** — State Road Dpt., [illegible]llahassee, clearing, grading, surfacing 7 [illegible] Rd. 39, Polk Co. and grading 1¼ mi. ea[illegible] roadway and constructing bridge on new [illegible]cation of Rd. 8, at intersection of Rd. 30, [illegible]ar Frostproof, to J. E. Ballenger, Lake[illegible] $116,558 and **$93,631** respectively***widen[illegible] surfacing 6¼ mi. Rd. 29, Glades Co. [illegible] applying treatment to 12 mi. Rd. 25, Palm Beach Co., to Ebersbach Constr. Co., Stovall Office Bldg., Tampa, **$44,611** and **$25,480** respectively***reworking surface treated pavement on 11 mi. Rd. 4, Brevard Co., to Manly Constr. Co., Ocala, **$69,412*****retreating 15 [illegible] Rd. 8, Highland Co., also constructing steel, concrete underpass at crossing of St. Johns River Terminal Co. tracks and new cut off on Rd. 4, on Kings Rd., incl. grading, paving approaches and about 3¼ mi. highway, to W. L. Cobb Constr. Co., 1st Natl. Bank Bldg., Tampa, **$28,014** and **$238,734** respectively***retreating 4 mi. Rd. 4[illegible], Hillsborough Co. and 7 mi. Rd. 18-A, Manatee Co., to Smith Service Co., St. Petersburg, $8,093 and **$12,401** respectively***9 mi. Rd. 4-A and 2 mi. Rd. 205, Dade Co., to Belcher Oil Co., 1217 Biscayne Blvd., Miami, **$12,955** and $2,856 respectively. Grand total $652,745. Bids May 26. Noted May 17, CD—May 19, ENR.

Illinois—State Dpt. P. Wks. & Buildings, Centennial Bldg., Springfield, improving 3.8 mi. Franklin Co., to Rock Hill Asphalt Constr. Co., Clayton, Mo., **$42.611*****0.21 mi. McLean Co., to Prothero & Wills, Bloomington, $21,**929*****0.68 mi. Macoupin Co., to Keeley Bros. Contg. Co., East St. Louis, **$36,158.** Grand total $100,698. Bids June 3. Rejected bids June 3, furnishing, applying 794,000 gal. road oil St. Clair Co. Noted May 31, CD.

Ill., Decatur—Macon Co., bituminous surface treatment 5.9269 mi. Project 351X RS-MT, to Walker Co., Sullivan, **$26,444.** Bids June 21. Noted June 14, CD—June 16, ENR.

Ill., Freeport — Stephenson Co., sheet asphalt binder surface course on 1.4773 mi. Liberty, Carroll, Shawnee and Spring Sts., to Gallagher Asphalt Co., Thornton, $45,01[illegible]. Bids June 16. G. H. Baker, Centennial Bldg., Springfield, state engr. co. roads and city streets.

Ill., Kankakee—Kankakee Co. Div. Hys., bituminous surface treatment 0.6771 mi. Sect. 19CS, also combination curbing and guttering, to Triangle Constr. Co., Kankakee, $14,841. Bids May 23. Noted May 19, CD.

Ill., Mt. Vernon—City Clerk, concrete resurfacing 0.4444 mi. Sect. 5CS, to Cardinal Constr. Co., East St. Louis, **$21,158.** Bids June 20. Noted June 17, CD.

Ill., Oswego—Dpt. P. Wks. & Buildings, Div. Hys., bituminous surfacing 0.186 mi. Sect. 5-CS, to J. W. Stahl Constr. Co., Somonauk, **$1,374.** Bids May 2. Noted Apr. 20, CD—Apr. 28, ENR.

Ill., Rockford—Road & Bridge Com. c/o Winnebago Co. Supt. Hys., concrete paving, etc., 3.0047 mi. State Aid Route 10, Sect. 42-15D, Harlem Twp., Winnebago Co., to Ray Mann Constr. Co., Rockford, $111,892. Bids June 10. Noted June 3, CD.

Ill., Waterloo—City constructing bituminous seal coat 32,140 sq. yd. various streets, to Bangert Bros. Constr. Co., Overland, Mo., at **18.5c.** per sq. yd. Bids June 16. Noted June 14, CD.

Ill., Waukegan—Lake Co., improving 2.9597 mi. Sect. 74 MFT, to Rock Road Constr. Co., 5915 Rogers Ave., Chicago, Ill., $13,949; and 3.5347 mi Sect. 59T MFT, to S. G. Hayes & Co., 910 South Michigan Ave., Chicago, **$18,007.** Bids June 16. Noted June 9, CD.

Indiana—State Hy. Comn., Indianapolis, rock asphalt resurfacing 3.529 mi. Adams Co., to Fairmount Constr Co., Fairmount, $75,619, est. $79,133***bituminous stabilized crushed stone surfacing 6.638 mi. Wells Co., to L. H. Gunsaulluus & Son, Kendallville, $45,595, est. $54,689***crushed stone surfacing 1.136 mi. Washington Co., to Kile Killman, Salem, **$33,945.** est. $39,303. Grand total $155,159. Bids May 24. Noted May 10 CD—May 12, ENR.

★ **Ind., Newcastle** — Henry Co., widening, paving 42 mi. roads, preparing 20 mi. for future paving, straightening 16 mi. roads, relief labor. **$500,000.** W.P.A. to pay ¾ and county ¼ of cost. Allotments approved.

Iowa — State Hy. Comn., Ames, grading 0.982 mi. Warren Co., to J. D. Armstrong, Ames, **$6,477*****2.227 mi. Woodbury Co. to Clarke Constr. Co., Merrill **$44,518*****stabilized or rolled stone base course and bituminous surfacing 2.477 mi. Buchanan Co., to Concrete Materials Co., Cedar Rapids, $26,760.

Streets and Roads (Continued)

Grand total **$77,755.** Bids June 21. Rejected bids June 21, furnishing 100 cu. yd. cover aggregate Audubon Co.; 900 cu.yd. cover aggregate Cass Co.; 500 cu.yd. cover aggregate Fremont Co.; 650 cu. yd. cover aggregate Montgomery Co.; 650 cu. yd. cover aggregate, Page Co.; 530 cu. yd. cover aggregate Pottawattamie Co. Noted June 13, CD—June 16, ENR.

Ia., Cherokee — H. M. Montgomery, aud. Cherokee Co., grading 24 mi. various secondary roads, to J. W. Scothorn Constr. Co., Cherokee, **$24,008.** Bids June 17. Noted June 13, CD.

Ia., Grundy Center—Bd. Superv. Grundy Co., surfacing 34,700 cu. yd. various secondary roads, to Beu & Sons, Sumner, Ia., **$40,695.** Bids June 20, awarded June 20. Noted May 26, CD.

Ia., LeMars—Plymouth Co., grading, installing culvert pipe 7 mi. secondary roads, to R. J. Ryan, Inc., Ottumwa, **$11,544.** Bids May 31. Noted May 23, CD—May 26, ENR.

Ia., Montezuma—Poweshiek Co., grading 6.49 mi. secondary roads, to Anderson & Empie, Marshalltown, **$10,806;** furnishing 1,178 ft. 18- to 42-in. concrete pipe, to Iowa Concrete Products Co., Ames, **$2,125*****1,018 ft. 15 in. corrugated metal pipe, to Reliable Culvert Co., Centerville, **$682.** Grand total $13,613. Bids May 20. Noted May 10, CD—May 12, ENR.

Kan., Abilene—Dickinson Co., road improvements, **W.P.A.** labor. **$104,171.** W.P.A. allotment approved.

Kan., Atchison—Atchison Co., road improvements, **W.P.A.** labor. **$92,086.** W.P.A. allotment approved.

Kan., Atwood—V. C. Chessmere, city clk., curbing, guttering, storm sewers, 6 in. rein.-con. paving 10,900 sq. yd. various roads, to W. Wallace, Atwood, **$25,030.** Bids June 10. Noted June 6, CD—June 9, ENR.

★ **Kan., Columbus**—Cherokee Co., road improvements. **W.P.A.** labor. **$673,642.** W.P.A. allotment approved.

Kan., Cottonwood Falls — Chase Co., road improvements, **W.P.A.** labor. **$68,704.** W.P.A. allotment approved.

Kan., El Dorado—Butler Co., road improvements, **W.P.A.** labor. **$223,724.** W.P.A. allotment approved.

Kan., Ellsworth—Ellsworth Co., road improvements, **W.P.A.** labor. **$38,099.** W.P.A. allotment approved.

Kan., Emporia—Lyon Co., road improvements, **W.P.A.** labor. **$134,806.** W.P.A. allotment approved.

Kan., Erie—Neosho Co., road improvements, **W.P.A.** labor. **$184,145.** W.P.A. allotment approved.

Kan., Fort Scott—Bourbon Co., road improvements, **W.P.A.** labor. **$206,179.** W.P.A. allotment approved.

Kan., Fort Scott—City, street improvements, **W.P.A.** labor. **$188,754.** W.P.A. allotment approved.

Kan., Garden City—Finney Co., road improvements, **W.P.A.** labor. **$52,973.** W.P.A. allotment approved.

Kan., Garnett—Anderson Co., road improvements, **W.P.A.** labor. **$71,916.** W.P.A. allotment approved.

Kan., Girard—City, street improvements, **W.P.A.** labor. **$63,818.** W.P.A. allotment approved.

Kan., Goodland—Sherman Co., road improvements, **W.P.A.** labor. **$101,574.** W.P.A. allotment approved.

Kan., Great Bend—Barton Co., road improvements, **W.P.A.** labor. **$42,560.** W.P.A. allotment approved.

Kan., Iola—Allen Co., road improvements. **W.P.A.** labor. **$238,662.** W.P.A. allotment approved.

Kan., Liberal—Seward Co., road improvements, **W.P.A.** labor. **$85,894.** W.P.A. allotment approved.

Kan., Lyons—Rice Co. constructing road improvement, **W.P.A.** labor. **$40,299.** W.P.A. allotment approved.

Kan., Mound City—Linn Co., road improvements, **W.P.A.** labor. **$136,201.** W.P.A. allotment approved.

Kan., Osborne—Osborne Co., road improvements, **W.P.A.** labor. **$68,437.** W.P.A. allotment approved.

★ **Kan., Oswego**—Labette Co., road improvements, **W.P.A.** labor. **$610,635.** W.P.A. allotment approved.

Kan., Ottawa—Franklin Co., road improvements, **W.P.A.** labor. **$101,929.** W.P.A. allotment approved.

Kan., Russell—Russell Co., road improvements, **W.P.A.** labor. **$52,273.** W.P.A. allotment approved.

Kan., Salina—Salina Co., road improvements, **W.P.A.** labor. **$236,529.** W.P.A. allotment approved.

Kan., Salina—City, street improvements, **W.P.A.** labor. **$42,746.** W.P.A. allotment approved.

Kan., Sedan—Chautauqua Co., road improvements, **W.P.A.** labor. **$163,013.** W.P.A. allotment approved.

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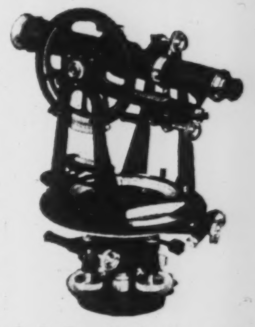

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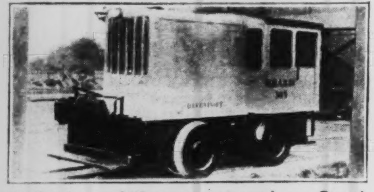

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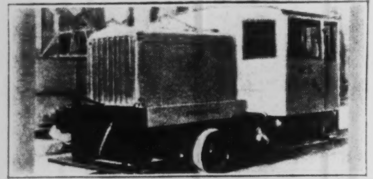

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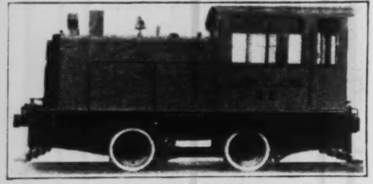

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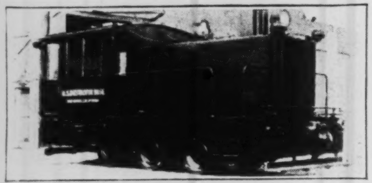

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Streets and Roads (Continued)

Kan., Silver Lake—City, street improvements, **W.P.A.** labor. **$27,669.** W.P.A. allotment approved.

Kan., Smith Center—Smith Co., road improvements, **W.P.A.** labor. **$116,535.** W.P.A. allotment approved.

★ **Kan., Topeka**—Shawnee Co., road improvements, **W.P.A.** labor. **$678,773.** W.P.A. allotment approved.

Kan., Tribune—Greeley Co., road improvements, **W.P.A.** labor. **$32,353.** W.P.A. allotment approved.

Kan., Troy—Doniphan Co., road improvements, **W.P.A.** labor. **$122,089.** W.P.A. allotment approved.

Kan., Westmoreland—Pottawattamie Co., road improvements, **W.P.A.** labor. **$299,790.** W.P.A. allotment approved.

Kan., Winfield—Cowley Co., road improvements, **W.P.A.** labor. **$232,460.** W.P.A. allotment approved.

Kan., Yates Center—Woodson Co., road improvements, **W.P.A.** labor. **$53,049.** W.P.A. allotment approved.

Kentucky—Dpt. Hys., Frankfort, grading, draining, bank gravel surfacing 4.165 mi. SP 258-AGS, Graves Co., to McDade & McDade, Fulton, **$37,104*****grading, draining, rock asphalt surfacing 4.526 mi. FA 186-BGS, Grayson Co., to McLellan & Campbell, Bowling Green, **$132,566*****grading, draining, traffic bound limestone surfacing 3.078 mi. FAS 436-BGS, Montgomery Co., to A. W. Walker & Son, Danville, **$125,592.** Grand total $295,262. Bids June 10. Noted June 21, CD—June 23, ENR.

Kentucky—Dpt. Hys., Frankfort, surface treating, using slag aggregate and asphalt cutback RC-2, on 10.511 mi. Princess-Bellefonte Rd., MP 176A, and 8.589 mi. Catlettsburg-Louisa Rd., SP 178A, Boyd Co., to Gay-Coleman Constr. Co., Lexington, **$13,883** and **$13,797** respectively***surface mix treating, using asphalt cutback MC-3 on 7.727 mi. REC 1F-BT, Marshall Co., 1 mi REC US 51 (detour) Fulton Co., and 4.8 mi. REC 9-½-A-1-BT, McCracken Co., to Corum & Edwards, Madisonville, **$55,894*****surface mix treating, using asphalt cutback RC-2 on 1 mi. RH 16 and 5 mi. RH 17, both Scott Co., 7.6 mi. RH 9, Bourbon Co., and 1.5 mi. RH 46, Franklin Co., to Kentucky Road Oiling Co., Frankfort, **$23,268.** Grand total $106,842 Bids June 17. Noted May 27, CD—June 2, ENR.

Louisiana—State Hy. Comn., Baton Rouge, L. P. Abernathy, H. B. Henderlite, state hy. engr., grading, surfacing 0.353 mi. hy. St. Martin Parish, to R. Angelle, Breaux Bridge, **$7,975*****grading, surfacing 12.35 mi. Madison Parish, to N. Cardinal & Co., Plaquemines, **$75,974*****6.203 mi. Jefferson Davis Parish, to Barber Bros. Constr. Co., Baton Rouge, **$18,158*****concrete paving 1.587 mi. Jefferson Parish, to T. L. James & Co., Ruston, **$207,258.** Grand total $339,365. Bids June 15. Noted May 26, CD—June 2, ENR.

Maine—State Hy. Comn., L. D. Barrows, ch. engr., Augusta, gravel surfacing 1.13 mi. hy., FAP 99-J, East Machias, to Rome Constr. Co., Main St., Holden, **$39,644***** 2.9 mi. FAP 146-E, Madrid and bituminous macadam surfacing 4.71 mi. FAP 25, Littleton, to W. H. Hinman, Inc., North Anson, **$77,985** and **$144,634** respectively. Grand total $263,263. Bids June 7, awarded June 15. Noted May 31, CD—June 2, ENR.

Maryland—State Roads Comn., Baltimore, concrete surfacing 6.76 mi. along Governor Ritchie Hy. (Annapolis Blvd. relocation), Contr. AA-211-2-329, Anne Arundel Co., to V. Schiavi, 900 Market St., Wilmington, Del., **$186,452.**

Maryland—State Roads Comn., Baltimore, grading, drainage 1.46 mi. highway, Contr. Ho-163-326, Howard Co., to Roberts Paving Co., Salisbury. **$76,000.** Bids May 31. Noted May 26, CD.

Maryland—State Roads Comn., Baltimore, concrete paving 3.6 mi. Contr. B-345-1-429 and Ho-157-3-329, Baltimore and Howard Counties, to V. Schiavi, 900 Market St., Wilmington, Del., **$186,595.** Bids June 14. Noted June 9, CD.

Maryland—State Roads Comn., Baltimore, grading, concrete paving 0.8 mi. Contr. W-193-1-627, Washington Co., to Cumberland & Contg. Co., Cumberland, **$87,973;** grading, drainage 1.7 mi. Contr. Ho-176-329, Howard Co., to Roberts Paving Co., Salisbury, **$84,904.** Bids May 31. Noted May 26, CD.

Minnesota—State Hy. Dpt., St. Paul, grading 4.8 mi. S.P. 9-10-58-1, FAP 63, and 3.3 mi. S.P. 28-28-31, FAP 407 (2), to De Ruyter Bros., Willmar, **$25,954** and **$35,634** respectively. Bids June 10. Noted May 25, CD—June 2, ENR.

★ **Mississippi**—E. D. Kenna, dir. State Hy. Comn., Jackson, improving 7.781 mi. Cruger-Greenwood-Winona Hy., and 7.943 mi. Tchula-Cruger-Greenwood Hy., LeFlore Co., to A. Guthrie & Co., Inc., 424 Endicott Bldg., St. Paul, Minn., **$150,390** and **$152,873,** respectively***2.015 mi. Neshoba Co., to E. E. Morgan Co., Inc., Century Bldg., Jackson, **$19,592*****4.133 mi. Attalla Co. and 13.001 mi. Covington and Jones Counties, to T. M. Strider & Co., West Meade Farm, Nashville, Tenn., **$48,806** and **$161,054** respectively*** 3.450 mi. Yazoo and Humphries Counties, to Ball Contg. Co., Fayette, **$125,383*****constructing overhead bridge 0.077 mi., Rankin Co., to Keliher Constr. Co., Thomas B[illegible] Dallas, Tex., **$91,854.** Grand total $74[illegible] Bids June 7. Noted May 26, CD.

Mo., Kansas City—Jackson Co., [illegible] lishing applying approximately 1,500,000 g[illegible] road oil on all roads (approximately 900 [illegible] roads), to Missouri Contg. Corp., 718 No[illegible] Starling St., at **6.41c.** per gal. Est. $96,[illegible] A. F. Sacks, Court House, engr.

Nebraska — State, Lincoln, gr[illegible] new driveways, paving, additions to bu[illegible] permanent walks, various smaller ite[illegible] State Fair grounds and buildings, **W.[illegible]** labor. **$233,355.** W.P.A. allotment appr[illegible]

Neb., Brewster—Blaine Co., road improvements, **W.P.A.** labor. **$67,141.** W.P.A. allotment approved.

Neb., Falls City—City, street improvements, **W.P.A.** labor. **$89,863.** W.P.A. allotment approved.

Neb., Greeley—Greeley Co., road improvements, **W.P.A.** labor. **$107,275.** W.P.A. allotment approved.

Neb., Nebraska City—Otoe Co., constructing road improvements, **W.P.A.** labor. **$91,145.** W.P.A. allotment approved.

Neb., Plattsmouth — City, road improvements, **W.P.A.** labor. **$72,040.** W.P.A. allotment approved.

Neb., Sidney—Cheyenne Co., road improvements, **W.P.A.** labor. **$48,163.** W.P.A. allotment approved.

Neb., Walthill—City, road improvements, **W.P.A.** labor. **$44,043.** W.P.A. allotment approved.

Nevada—R. A. Allen, engr. State Hy. Dpt., Carson City, improving 24.12 mi. Nye Co. and 12.05 mi. Elko Co., to W. W. Clyde & Co., Springville, Utah, **$113,365** and **$67,499** respectively***12.74 mi. Nye Co., to U. B. Lee, 1159 Estudillo Ave., San Leandro, Calif., **$22,778*****20.4 mi. Clark Co., to J. A. Carson, 22,105 Meekland Ave., Hayward, Calif., **$76,350.** Grand total $279,942. Bids June 16. Noted June 2 and 8, CD—June 9, ENR.

Nevada—R. A. Allen, engr. State Hy. Dpt., Carson City, grading, surfacing 24.12 mi. Nye Co., to Nevada Rock & Sand Co., Box 4626, Reno, **$114,631.** Bids June 16. Noted June 2, CD—June 9, ENR.

New Jersey—E. D. Sterner, comr. Hy. Dpt., Trenton, grading 1.303 mi. Route 6, Sect. 8A, Lexington Ave. to Main Ave., Clifton, Passaic Co., to Union Building & Constr. Co., 631 Main Ave., Passaic, **$130,995.** Bids June 8. Noted May 26, CD—June 2, ENR.

N. J., Bergenfield—Boro, grading penetration macadam paving 1.66 mi. Prospect Ave. from Dumont Boro line to Newbridge Rd., relief labor. **$30,800. W.P.A.** Materials will be purchased by owner. McClave & McClave, 60 George Rd., Cliffside Park, engrs.

N. J., Hohokus—Town, regrading and penetration macadam paving 2.25 mi. Ridge Rd. from Ramapo to Ramsey Aves., relief labor. **$87,404. W.P.A.** Material will be purchased by owner. F. E. Harley, Fairlawn Ave., Fairlawn, engr.

N. J., Kearny—Town, bituminous sheet asphalt paving 12,000 ft. Kearney Ave. from Belleville Turnpike to Johnson Ave., to Standard Bitulithic Co., 50 Church St., New York, **$77,250.** Bids June 8. Noted May 26, CD—June 2, ENR.

N. J., Phillipsburg—Town, grading, drainage, penetration macadam paving various streets, relief labor. **$127,999. W.P.A.** Materials will be purchased by Town. W. J. Burke, foot of 5th Ave., Paterson, W.P.A. and owner's engr.

N. J., Princeton—Bd. Freeholders, Mercer Co., paving Washington Rd. from Princeton Boro line to Delaware and Raritan Canal, to Courtney & Cunningham, 370 Newkirk Ave., Trenton, **$42,030.** Bids June 21, awarded June 21.

N. J., Ridgewood—Village, grading, drainage, penetration macadam paving Grove St. from South Vandien Ave. to Paramus Rd., relief labor. **$33,783. W.P.A.** Materials will be purchased by owner. R. A. Hartom, Village Hall, engr.

N. J., Rockaway — Boro paving various roads, relief labor, **$30,850. W.P.A.** Materials will be purchased by Boro and W.P.A. in ratio of 3 to 1. W. J. Burke, foot of 5th Ave., Paterson, W.P.A. and owner's engr.

N. J., Wychoff—Town, grading, penetration macadam paving Godwin Ave. from Franklin to Wyckoff Aves., relief labor. **$29,358. W.P.A.** Materials will be purchased by owner. F. Harley, Fairlawn Av., Fairlawn, engr.

New Mexico—G. F. Conroy, engr., State Hy. Dpt., Santa Fe, improving 10.788 mi. FAP 73B, Catron Co., and 6.019 mi. FAP 184 A, Hidalgo Co., to Skousen Bros., Albuquerque, **$161,623** and **$74,583** respectively est. $170,000 and $100,000 respectively***9.847 mi. Dana Ana Co., to Sanders Bros., Santa Fe, **$52,437** est. $65,000***22.596 mi. Otero Co., to A. O. Peabody, Santa Fe, **$156,703** est. $200,000. Grand total $445,346. Bids June 17. Noted June 9, CD.

N. Y., Ballston Spa—City, constructing additional sidewalks, relief labor. Est. **$31,067.** Owner's and **W.P.A.** Engineers purchase material and supervise construction. W.P.A. funds allotted.

N. Y., Endicott and **Tioga** — Villages of Endicott and Tioga, constructing roads and sidewalks in respective villages, relief labor.

Streets and Roads (Continued)

To exceed $25,000. Owner's and **W.P.A.** Engineers supervise construction and will purchase materials. W.P.A. Engineer's Office, Telephone Bldg., Binghamton, engr.

N. Y., Rochester—Dpt. P. Wks., bituminous paving Cairn St. and other streets, own forces. To exceed **$25,000.** Ordinance approving work, adopted.

N. C., Lumberton—Robeson Co., improving roads. **W.P.A.** labor. **$58,332.** G. W. Coan, Jr., Raleigh, state administrator.

O., Dayton—Montgomery Co., asphalt emulsion treatment with C T tar primer and surface treatment with asphalt emulsion county roads to E. Kammer, 321 Northwestern Ave., Dayton, **$94,811** and **$98,475** respectively. Bids June 16. Noted June 3, CD—June 9, ENR.

O., New Philadelphia—Tuscarawas Co., repaving boulevard in Fourth St. N.W., **W.P.A.** labor. **$90,000.** $46,683 W.P.A. funds allotted.

Oklahoma—State Hy. Dpt., grading, draining 5.94 mi. farm-to-market roads, Marshall Co., to Lee Pool & Sons, Fairview, **$35,216,** est. $39,722***4.46 mi. U. S. 62, McClain Co., to J. E. Smith & Son, Noble, **$44,913,** est. $53,800***1.88 mi. FAP 328C, McClain Co., and 2.48 mi. FAP 427D, Marshall Co., to Merveldt & Stebbins, El Reno, **$17,371** and **$17,553** respectively, est. $20,428 and $21,497 respectively. Grand total $115,053. Bids June 21. Noted June 8, CD.

Okla., Lawton—Comanche Co., grading, draining 7 mi. highway at Medicine Park, **W.P.A.** labor. **$84,840.** W. L. Benham, 431 Main St., Oklahoma City, engr.

Okla., Muskogee—Muskogee Co., grading, draining 35 mi. farm-to-market roads, **W.P.A.** labor. **$209,080.** W. L. Benham, 431 Main St., Oklahoma City, engr.

Okla., Muskogee—City, corner set backs on paved streets, **W.P.A.** labor. **$105,503.** B. Patrick, Muskogee, engr.

Okla., Nowata—Nowata Co., grading, draining 7 mi. farm-to-market roads, **W.P.A.** labor. **$25,805.** W. L. Benham, 431 Main St., Oklahoma City, engr.

Okla., Okemah—Okfuskee Co., grading, draining, 30 mi. farm-to-market roads, **W.P.A.** labor. **$150,000.** W. L. Benham, 431 Main St., Oklahoma City, engr.

Okla., Sapulpa—Creek Co., grading, draining 60 mi. roads, **W.P.A.** labor. **$300,000.** W. L. Benham, 431 Main St., Oklahoma City, engr.

Okla., Wewoka — Seminole Co., building 20 mi. farm-to-market roads, **W.P.A.** labor. **$151,252.** W. L. Benham, 431 Main St., Oklahoma City, engr.

Oregon—State Hy. Comn., Portland, oiling 3.33 mi. Robert-Oroville Sect., Halls Ferry Co. Rd., Marion Co., to McNutt Bros., Eugene, **$13,805;** grading, surfacing, oiling 1.73 mi. Washington Co.-Skyline Blvd. Sect. Northwest Thompson Co. Rd., Multnomah Co., to Saxton, Looney & Saxton, Oak Grave, **$32,669.** Bids June 2. Noted May 24, CD.

Oregon—State Hy. Comn., Portland, oiling, grading, surfacing 2.95 mi. Coos Co., to Berke Bros., 815 South East Harrison St., Portland, **$136,314*****3.4 mi. Wallowa Co., to Rogers Constr. Co., Dayton, Wash., **$23,365** ***paving 3.3 mi. Multnomah Co., to H. Blake, 400 North Thompson Ave., Portland, **$139,109*****oiling 0.7 mi. and surfacing 1.9 mi., Wasco Co., to H. L. Rice, 5816 South West Hood St., Portland, **$12,745** *** oiling 3.22 mi. Columbia Co., to E. C. Gerber, Oregon City, **$12,272.** Grand total $323,805. Bids June 15. Noted June 6, CD.

Ore., Madras—Jefferson Co., improving and constructing roads, day labor. **$25,800. W.P.A.** approval.

Ore., Pendleton — Umatilla Co., highway improvements, day labor, **$64,692. W.P.A.** grant of $20,077 approved, plus $44,615 county funds.

Pa., Williamsport—City, new sidewalk construction and repair project throughout city, day labor under supervision of L. Mussina, city engr., City Hall, **$69,000.** City will purchase materials and equipment to cost $22,000. City council soon takes bids on materials requirements for above project, incl. cement.

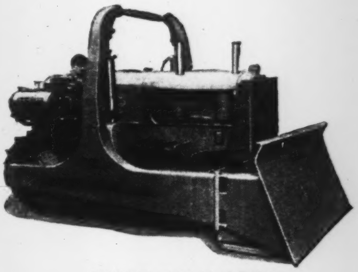
S. D., Deadwood—City street improvements, **W.P.A.** labor. City officials have acted favorably on project and have made agreement with W.P.A. to pay 20% of costs as sponsors, partly covered by material on hand and rental of equipment.

S. D., Sioux Falls—Minnehaha Co., road improvements, **W.P.A.** labor. County officials have acted favorably on project and have agreed with W.P.A. to pay 20% of costs as sponsors, which is partly covered by material on hand and rental of equipment.

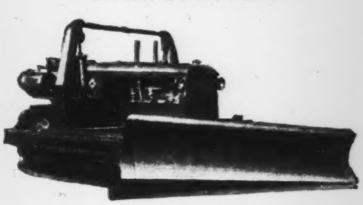
Texas — J. Montgomery, engr. State Hy. Dpt., Austin, improving 20.867 mi. San Patricio and Live Oak Counties and 5.757 mi. Waller Co., to Holland Page, Norwood Bldg., Austin, **$168,372** and **$27,359** respectively. Bids May 24. Noted May 26, CD.

Virginia—Dpt. Hys., Richmond, to G. P. Clay, Richmond, macadam surface treating Route 360, Halifax Co., **$78,400;** Route 360, Charlotte and Halifax Counties, **$76,510;** Route 33, Rockingham Co., **$61,965;** sand clay surface treating Route 3, Lancaster Co., **$6,660**

BAKER TRACTOR EQUIPMENT



BAKER BULLDOZER



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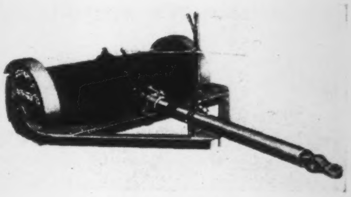

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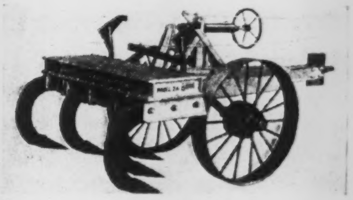

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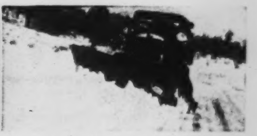

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Streets and Roads (Continued)

to Cobb & Homewood, Inc., Chapel Hill, N. C., rein.-con. paving Route 1, Mecklenburg Co., **$26,428**to R. K. Williams & S. E. Finley, Belt Line and Clay St., Richmond, sheet asphalt paving Route 1, Dinwiddie Co., **$132,655*****to W. H. Scott, Franklin, rein.-con. paving Route 460, Prince George Co., **$203,541** ***to Robert Martin Co., Salem, Route 16, Powhatan Co., **$39,412*****to Southern Stone Corp., Roanoke, macadam surface treating Route 60, Alleghany Co., **$20,918*****to W. N. Jackson & R. E. Mills Co., Roanoke, macadam surface treating Route 304, Halifax Co., **$31,810*****to R. E. Mills Co., Frankfort, Ky., traffic macadam surface treating Route 42, Craig Co., **$59,593.** Grand total $737,892. Bids June 14. Rejected bids June 14, widening bridge over Broad Creek, Route 58, Norfolk and Princess Anne Counties. Noted June 3, CD—June 9, ENR.

★**Wash., Aberdeen**—City, grading, surfacing, draining and constructing sidewalks, relief labor under $383,471 **W.P.A.** allotment **$741,747.** City to buy materials. S. C. Watkins, City Hall, engr.

Wash., Hoquiam—City, clearing, grading, grubbing, draining, surfacing and constructing sidewalks, relief labor, under $222,727 **W.P.A.** allotment. **$476,538.** W. L. Lovejoy, City Hall, engr.

Wash., Leavenworth—City, grading, clearing, draining, surfacing various streets, **W.P.A.** labor. **$28,586.**

Wash., Port Angeles—City, light bituminous surfacing streets and alleys, **W.P.A.** labor. **$255,247.** H. E. Dodge, City Hall, engr.

Wash., Seattle—City, clearing, grubbing, draining, ditching, sloping, gravel surfacing, etc. 5.5 mi. West Alaska and West Genesee Sts., Fauntleroy, 35th Ave. S. W. and Roxbury Aves., et al, relief labor under $95,995 **W.P.A.** allotment. **$110,000.** C. L. Wartelle, County City Bldg., engr.

★**Wash., Spokane**—City grading throughout city, relief labor. **$756,200.** A. D. Butler, City Hall, engr.

★**Wash., Spokane**—Spokane Co., grading, surfacing 150 mi. roads, incl. Cheney-Marshall Hy., **W.P.A.** labor. **$1,021,788.** C. F. Griggs, Courthouse, engr.

Wash., Walla Walla—Walla Walla Co. Comn., oiling road mix method, 35 mi. roads, to Standard Asphalt Paving Co., Chronicle Bldg., Spokane, **$42,000.** Est. $52,500. Bids June 13. Noted June 2, CD.

★**Wisconsin**—State Hy. Comn., Madison, improving 3.802 mi. Rock Co., to James Cape & Sons Co., 468 Water St., Racine, **$117,933** ***1.533 mi. Waupaca and Winnebago Counties, and 0.963 mi. Winnebago Co., to J. Rasmussen & Sons Co., East End 7th St., Oshkosh, **$58.168** and **$14,655** respectively***1.948 mi. Manitowoc Co., to Jaeger Bros., Inc., West Bend, **$39,154*****2.223 mi. Pepin Co. and 5.021 mi. Dun Co., to L. G. Arnold, Inc., Eau Claire, **$17,762** and **$80,507** respectively*** 2.930 mi. Pierce Co., to Cumberland Constr. Inc., Cumberland, **$58,159*****0.227 mi. Manitowoc Co., to Schuster Constr. Co. & E. Schuster, Denmark, **$18,762*****5.308 mi. Iowa Co., to C. H. Temby, Mineral Point, **$12,699** ***10.109 mi. Shawano Co., to Payne & Dolan of Wisconsin, Inc., 735 North Water St., Milwaukee, **$61,720*****2.895 mi. Grant and Crawford Counties, to Philo Dempsey & Son, Fennimore, **$2 106.** Grand total $511,625. Bids June 21. Noted June 3, CD—June 9, ENR.

Wis., Milwaukee—Dpt. P. Wks., to Gumz & Switalski, 2065 South 18th St., improving alley between South 17th and 18th Sts., **$1,495;** East Holt Ave., **$666;** North 33rd St., **$534;** South 5th St., **$1,264;** South 75th St., **$578;** West Keefe Ave., **$2,071;** West Leeds Pl., **$990*****to J. C. Blukim & Son, 3256 North 3rd St., alley between North 19th St. and North 19th Pl., **$2,652;** North 51st St., **$1,645.** Bids May 6***to F. M. Gagliano, 1513 North Jackson St., paving at water purification plant, **$41,500.** Bids June 6. Grand total $53,395. Noted May 20, CD—May 26, ENR.

Wis., Milwaukee—Dpt. P. Wks., improving alley between South 45th and West Scott Sts. and alley between South 8th and South 9th Sts., etc., to J. C. Bluhm & Son, 3256 North 3rd St., **$1,238** and **$2,547** respectively ***alley between South 8th, South 9th and West Harrison Sts., to N. Harris, 826 North Cass St., **$1,119*****alley between East Morgan and Wilbur Sts., to J. G. Jansen Constr. Co., 300 North 38th St., **$652*****East North Ave., to Milwaukee Constr. Co., 2808 North Sherman Blvd., **$20,625*****South 35th St., to Badger Constr. Co., 229 East Wisconsin Ave. Grand total $87,779. Bids June 15, awarded June 16. Noted June 13, CD.

B. C., Vancouver—City, asphaltic macadam paving 31st Ave., also sidewalks on various streets, day labor. **$25,940.**

Ont., Gold Pines — Dpt. Hys., Toronto, waterbound macadam repaving 49 mi. Uchi Mines Rd., to M. L. Macheau, Box 506, Oakville. Est. **$45,000.**

Ont., Kitchener—City will open up 500 ft. Charles St. and extend same to Ontario St., 50 ft. wide, asphalt pavement, curbs and gutters, day labor under supervision of S. Shupe, engr., City Hall. **$28,000.**

Ont., Port Arthur—City, 1 in. asphaltic concrete on 3 in. block base paving 2nd, Lincoln and Van Norman Sts., to Hewitson Constr. Co., Walsh Blk. Est. **$25,000.** S. E. Flook, City Hall, engr.

EARTHWORK, WATERWAYS

PROPOSED WORK

★**Ark., Hot Springs—Arkansas** Power & Light, Pine Bluff, plans combined flood control and power dam on Ouachita River 14 mi. northwest of here. $6,000,000. C. S. Lynch, Pine Bluffs, engr.

Calif., Los Angeles—Flood Control Dist., 751 South Figueroa St., plans constructing groynes on publicly-owned beach between Santa Monica and El Segundo. $50,000. C. H. Howell, 751 South Figueroa St., engr. Project approved by A. Jones, county engr. and L. Aldrich, city engr. City will provide $27,000 and County $23,000 funds.

Calif., Paradise Cut — Governor Merriam has authorized expenditures (exceeding $25,000) from State Emergency Flood Relief fund to finance immediate repair of San Joaquin River levee break here.

Conn., New Britain — City, P. Wks. Dpt., City Hall, making plans for straightening and improving Piper Brook from Vibberts Lot to Newington Town Line, for distance about 6,000 ft. incl riprapping both banks entire distance, also stone at water's edge. $25,000. G. Molleur, City Hall, engr.

Idaho, Lewiston—Washington Water Power Co., 825 Trent St., Spokane, Wash., plans constructing two additional fish ladders over Clearwater River Dam. $250,000.

Illinois—East Side Levee & Sanitary Dist., S. H. Kernan, pres., 628A Missouri Ave., East St. Louis, preliminary plans converting Horseshoe Lake in Madison Co. into reservoir for storage of excess waters of Cahokia Creek Drainage Canal, incl. a leader canal between southeast end of lake and canal and control station. $250,000. W. W. Horner & H. Shifrin, International Office Bldg., St. Louis, Mo., engrs.

N. J., Irvington—Town, Town Hall, plans constructing wall and bed in the Elizabeth River. $150,532. W. P. A. project. J. J. Casey, Town Hall, town and W.P.A. engr.

N. J., Newark and Bellville—Essex Co. Park Comn., 115 Clifton Ave., plans excavating river channel, constructing rebutment wall, planting, etc., on south bank of river through county park. $133,312. W.P.A. project. Materials will be purchased by County and W.P.A. in ratio of 5 to 1. H. J. Phillips, 115 Clifton Ave., Newark, co. and W.P.A. engr.

N. J., Orange—Town, Town Hall, plans removing silt and constructing rein.-con. bed in Wigwam Brook. $63,106. Materials will be purchased by Town and W.P.A. in ratio of 6 to 1. K. Crane, Town Hall, town and W.P.A. engr.

N. Y., Schenectady—City, City Hall, plans constructing backwater gates and a pumping station on Washington Ave., near Barge Canal, terminal to help prevent flooding of lower Broadway section, during high water. $100,000. Project will mature as soon as financing is arranged. L. C. Purdy, city engr. Noted Dec. 21, CD—Dec. 30, ENR.

★**†N. Y., Whitney Point**—U. S. Eng., Security Mutual Bldg., Binghamton, plans will be released to bidders during week of June 27, constructing dam and tunnel. $1,900,000. Noted Apr. 27, CD—May 5, ENR.

Oregon—State Advisory Com. recommended to State Planning Bd., construction of 6 earth filled dams to develop land and water resources in Deschutes and Crook Counties. Regulatory dam on Tumals Creek would cost $40,000, another on Beaver Creek $35,000. Total cost $100,000. G. Kanoff, Bend, engr.

†Pa., Erie—U. S. Eng., Federal Bldg., Buffalo, N. Y., plans dredging portion Erie Harbor, Lake Erie during spring 1939. War Dpt. approved expenditure $19,000.

★**South Carolina** — South Carolina Public Service Authority, c/o B. R. Maybank, Southern Home Bldg., Charleston, chn., making plans hydro-electric and navigation project on Santee and Cooper Rivers, known locally as Santee-Cooper Hydro-electric Project. $37,500,000. F. R. Sweeney, ch. engr. for authority. Chief engineer for construction not appointed. Noted June 15, CD—June 23, ENR.

Tex., El Paso—El Paso Co. making plans constructing approximately 21 mi. ditch, 6 rubble masonry check dams and 1 concrete bridge in upper valley. $147,000. P.W.A. allotted $66,272 grant. J. W. Carter, El Paso, engr.

B. C., Nanaimo—Municipality making plans protection wall at Passage Inlet. $[illegible],000. A. G. Graham, City Hall, engr.

BIDS ASKED

†Arkansas—July 6, by U. S. Eng., P. O. Box, 97, Memphis, Tenn., constructing concrete headwalls for 11 metal culverts and concrete box culvert and 24,000 cu. yd. earthwork on left bank of Arkansas River below Plumb Bayou.

★**†Calif., Los Angeles**—Aug. 8, by U. S. Eng., 751 South Figueroa St., constructing Hansen Dam, earth fill, 9,050 ft. crest, 100 ft. max. height, concrete spillway with capacity of 100,000 sec. ft. incl. diversion and care of water during construction removal of existing structures, clearing site, 266,000 cu. yd. stripping for dam and dykes, 639,[illegible] cu. yd.

Earthwork, etc. (Continued)

common excav., 8,600,000 cu. yd. excav. in borrow pit "A", 5,620,000 cu. yd. excav. in borrow pit "B", 95,000 cu. yd. rock excav., 1,000 lin. ft. 5 ft. diam. caissons, etc., Spec. 509-38-618. **$10,500,000.** Noted Jan. 14, CD—Jan. 20, ENR.

†**D. C., Wash.**—July 22, by U. S. Eng., 1068 Navy Bldg., removal 722 cu. yd. rock or alternately 1,442 cu. yd., place measurement, from Washington Harbor; adv. ENR June 30.

†**Massachusetts**—July 12, by U. S. Eng., Boston, Mass., dredging approximately 898,900 cu. yd. scow measurement of material between Station 15 plus 00 and Station 70 plus 00 and between Station 375 plus 00 and Station 430 plus 00, Cape Cod Canal, Inv. 175-38-140; adv. ENR June 30.

†**Neb., Rulo**—July 12, by U. S. Eng., 232 Mfgrs. Exch. Bldg., Kansas City, Mo., constructing standard and pile revetment on Missouri River at Rulo to White Cloud Bends, vicinity of here.

N. Y., Hamlin—July 12, by C. A. Van Arsdale, executive secy. Genesee State Park Comn., Castile, constructing 300 ft. concrete jetty, together with appurtenances in Hamlin Beach State Park, Monroe Co. Est. $26,000.

†**N. Y., Rondout (Sta. Kingston)**—July 26, by U. S. Eng., 39 Whitehall St., New York, dredging approximately 57,970 cu. yd. material other than ledge rock and approximately 404 cu. yd. ledge rock in Rondout Harbor, included within the area extending from approximately 0.62 mi. above mouth of creek to west end of Island Dock, about 1.25 mi.; adv. ENR June 30.

★†**N. Y., Whitney Point**—July 28, by U. S. Eng., Security Mutual Bldg., Binghamton, N. Y., constructing Whitney Point Dam, consisting earth dam embankment, spillway and outlet works, 2,600,000 cu. yd. common, 113,000 cu. yd. rock and 13,100 cu. yd. tunnel excav. $1,900,000. Noted June 23, CD.

N. B., Botsford—July 14, by Secretary Dpt. P. Wks., Ottawa, Ont., constructing breakwater, incl. 77,000 cu. ft. timber, 25,000 ft. creosoted covering, 75,500 cu. ft. untreated timber, 4,500 lb. steel plates and fastenings. $30,000. K. M. Cameron, Ottawa, Ont., engr. Noted June 3, CD—June 9, ENR, under "Nova Scotia."

B. C., New Westminster—July 7, by Secretary Dpt. P. Wks., Ottawa, Ont., constructing jetty at West Arm of Fraser River, incl. 18,000 tons rock in place. $34,000. K. M. Cameron, Ottawa, Ont., engr.

New Brunswick—July 6, by Secretary Dpt. P. Wks., Ottawa, Ont., dredging 21,430 cu. yd. mud, sand and clay floating dredgwork at Caraquet (Young Wharf) $15,000; 16,500 cu. yd. mud, sand, clay and gravel at St. Simon, and 10,000 cu. yd. sand, clay and gravel at Middle Caraquet, $19,500. K. M. Cameron, Ottawa, Ont., engr. Noted June 3, CD—June 9, ENR.

Ont., Goderich—July 6, by Secretary Dpt. P. Wks., Ottawa, dredging 86,000 cu. yd. sand and clay floating dredgework in Area A, 37,500 cu. yd. sand and clay floating dredgework in Area B, 11,000 cu. yd. sand and clay floating dredgework in Area C and 11,200 cu. yd. rock floating dredgework in Area C. $91,300. K. M. Cameron, Ottawa, engr. Noted June 3, CD—June 9, ENR.

LOW BIDDERS

★**Nebraska**—Central Nebraska Public Power & Irrigation Dist., Third St. and St. Joseph Ave., Hastings, June 21, relocation of Union Pacific R.R. tracks, from Morrison-Knudsen Co., 319 Bway, Boise, Idaho and Utah Constr. Co., Salt Lake City, Utah, $751,900***railroad drainage structures, from M. E. Gilloz, Monett, Mo., $214,899***relocation of county roads, from Inland Constr. Co., 3867 Leavenworth St., Omaha, $82,157. Total $1,048,956. Noted June 1, CD—June 9, ENR.

CONTRACTS AWARDED

★†**Arizona**—U. S. Indian Irrigation Service, 751 South Figueroa St., Los Angeles, Calif., constructing 1,450 ft. rolled earth fill diversion dam, 50 ft. high with spillway 250 ft. wide, on Colorado River, at Head Gate Rock Dam, to Rohl-Connolly Co., 4351 Valley Blvd., Los Angeles, Calif., **$1,890,407.** Bids June 6. Noted June 10, CD—June 16, ENR.

†**Calif., Calexico** — Bureau Reclamation, Wash., D.C., constructing structures along 25 mi. All American Canal and New Briar Canal, to Atlas Constr. Co., 39 Congress St., Pasadena. **$262,240.** Bids May 24. Noted May 3, CD—May 5, ENR.

†**Kan., Topeka**—U. S. Eng., Manufacturers Exch. Bldg., Kansas City, Mo., constructing 2 sections of earthen levee and concrete retaining wall in conncetion with Topeka Kansas Flood Control Project, to R. G. Aldridge, 1310 State St., Kansas City, **$113,850.** Est. $150,000. Bids June 18. Noted June 8, CD.

★**Nebraska**—Central Nebraska Public Power & Irrigation Dist., G. E. Johnson, ch. engr. and genl. mgr., Hastings, constructing Jeffrey Section of supply canal, being Groups 16, 20A, 21A and 31A, to Morrison-Knudsen Co., 319 Bway., Boise, Idaho, **$1,091,849.** Bids May 27. Noted June 3, CD—June 9, ENR.

†**Nev., Boulder City**—Bureau Reclamation, Yuma, Ariz., constructing Power Drop No. 1

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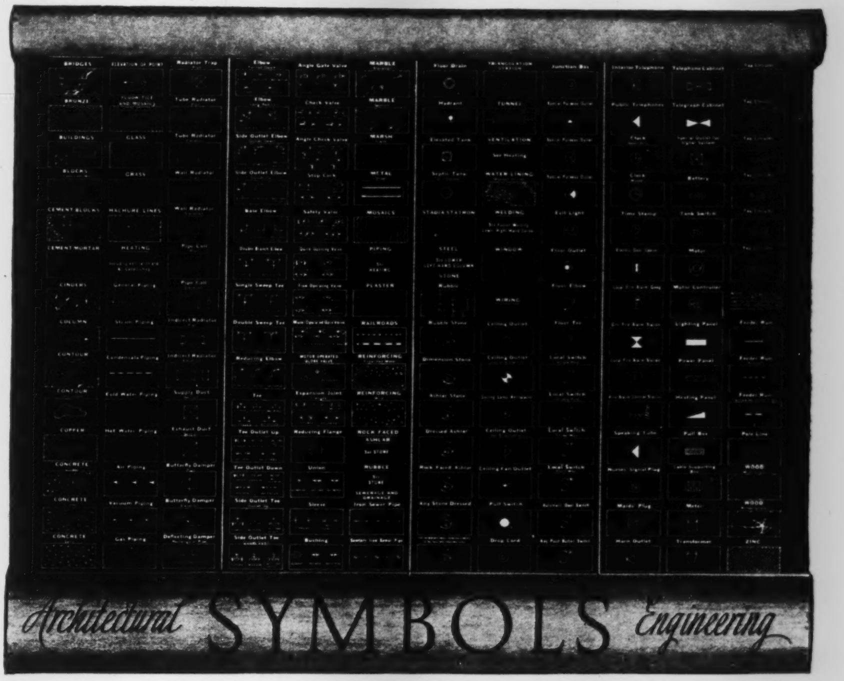
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and Coachella Canal turnout, to Lewis-Chambers Constr. Co., 707 Baronne Bldg., New Orleans, La., **$145,119.** Bids May 23. Noted Apr. 29, CD—May 5, ENR.

New York—T. F. Farrell, ch. engr., State Dpt. P. Wks., State Bldg., Albany, excavation in barge canal, U. S. Contr. 36, from Station 782 plus 00 in Schenectady Co. to Station No. 711 plus 00 in Saratoga Co., to Great Lakes Dredge & Dock Co., Morgan Bldg., Buffalo. Est. **$58,800.** Bids May 16. Noted Apr. 13, CD—Apr. 21, ENR.

†N. Y., Albany—U. S. Eng., Whitehall Bldg., New York, and Wash., D.C., dredging in Hudson River, own forces. **$234,000.** Funds appropriated.

★**N. Y., Brooklyn**—Commissioner Parks at office Dpt. Parks, Arsenal Bldg., 64th St. and 5th Ave., Central Park, New York, riprap, bulkhead and hydraulic fill along Shore Rd. from Owl's Head Park to Fort Hamilton Park, Contr. B-82-A-237, to J. Rich Steers, 17 Battery Pl., New York, **$857,973.** Bids May 26. Noted May 27, CD—June 2, ENR.

N. Y., New York — Commissioner Parks, Dpt. Parks, Central Park, Arsenal Bldg., 64th St. and 5th Ave., mud excavation and hydraulic fill along Orchard Beach, Pelham Bay Park, Bronx Boro, Contr. X-39-138, to Construction Aggregates Co., 33 North La-Salle St., Chicago, Ill., **$69,230.** Bids May 27. Noted May 19, CD.

Okla., Tulsa—Tulsa Co., constructing jetties along Arkansas River, **W.P.A.** labor. **$335,734.** W. E. Davis, Tulsa, engr.

★**Okla., Vinita**—Grand River Dam Authority, Vinita, general construction Grand River project (Pensacola Dam), contr. 7, dam and power house, to Massman Constr. Co., New York Life Bldg., Kansas City, Mo., **$9,322,960*****contr. 5, hydraulic turbines, governors and valves, to Allis Chalmers Mfg. Co., 1126 South 70th St., Milwaukee, Wis., **$659,650** ***contr. 6, electric generators, to Westinghouse Electric & Mfg. Co., 20 North Wacker Dr., Chicago, Ill., and Union Bank Bldg., Pittsburgh, Pa., **$679,110.** Grand total $10,661,720. Bids June 17. Noted June 21, CD—June 23, ENR.

†Oregon—U. S. Eng., 628 Pittock Blk., Portland, channel clearing and dredging in Lambert Slough, Willamette River, to Pacific Building Material Co., 400 North Thompson St., Portland, **$15,437.** Bids June 15. Noted June 6, CD—June 9, ENR.

†Ore., Astoria—U. S. Eng., Pittock Blk., Portland, Warrenton flood control dike project, involving 8 mi. dike on Youngs Bay, Columbia River, with riprapping at 12 tide boxes, to Gilpin Constr. Co., Henry Bldg., Portland, **$171,000.**

†Ore., Eugene—U. S. Eng., 628 Pittock Blk., Portland, dredging 35,000 cu. yd. from channel at Lincoln Bar in Willamette River about 77.5 mi. above river mouth, to Pacific Building & Materials Co., 400 North Thompson St., Portland, **$9,625.**

Pennsylvania—State Dpt. Health, Harrisburg, drainage work in rural York Co., **$15,800;** Adams County, **$3,144;** Franklin Co., **$8,090,** to alleviate unsanitary conditions in sections where sewerage systems are impracticable, day labor. Grand total $27,034. **W.P.A.** R. D. Hoak, c/o Owner, sanitary engr. Noted June 8, CD—June 16, ENR.

†Virginia and North Carolina—U. S. Eng., 410 Post Office and Court House, Norfolk, Va., dredging approximately 179,000 cu. yd. material in Inland Waterway from Norfolk, Va., to Beaufort Inlet, N. C., to S. B. Brooks, Inc., South and Water Sts., Baltimore, Md. **8.32c.** per cu. yd. place measurement. Bids May 3. Noted Apr. 27, CD—May 5, ENR.

†Va., Norfolk—Yards & Docks, Wash., D.C., dredging at Naval Operating Base, to Norfolk Dredging Co., Norfolk. **$158,184.** Bids June 15. Noted June 8, CD.

British Columbia—Dpt. P. Wks., Ottawa, Ont., dredging in Harrison River, to McKenzie Barge & Derrick Co. Ltd., 2216 Cambridge St., Vancouver, **22.25c.** per cu. yd., total **$11,125.** Est. $16,800. Bids June 15. Noted May 31, CD—June 2, ENR.

N. S., Bear River—Dpt. P. Wks., Ottawa, Ont., 22,150 cu. yd. sand, silt and clay floating dredgwork, to Saint John Dredging Co., Ltd., St. John, **90c** per cu. yd., total **$19,935.** Est. $20,500. Bids June 14. Noted May 31, CD—June 2, ENR.

N. S., Brooklyn — Dpt. P. Wks., Ottawa, Ont., repairing breakwater, to Foundation Maritime, Ltd., 1538 Sherbrooke St. W., Montreal, Que., **$177,288.** Est. $165,000. Bids June 17. Noted June 3, CD—June 9, ENR.

N. S., Digby—Dpt. P. Wks., Ottawa, Ont., dredging 67,800 cu. yd. Class B floating dredgework, to Saint John Dry Dock & Shipbuilding Co., Ltd., St. John, at **49c.** per cu. yd., total **$33,222.** Bids June 17. Noted June 7, CD—June 9, ENR.

N. S., Fourchu — Dpt. P. Wks., Ottawa, Ont., 45,806 cu. yd. sand, clay, gravel and stone floating dredgework, to Fundy Constr. Co., Ltd., Halifax, **57c.** per cu. yd., total **$26,110** plus. Est. $27,300. Noted June 3, CD—June 9, ENR, under "Nova Scotia."

N. S., Liverpool — Dpt. P. Wks., Ottawa, Ont., dredging in harbor, incl. 54,000 cu. yd. floating dredgework, to St. John Dry Dock & Shipbuilding Co., Ltd., East St. J[illegible] per cu. yd., total **$37,8000** plus. E[illegible] Bids June 21. Noted June 7, CD[illegible] ENR.

Ontario—Dpt. P. Wks., Ottawa, [illegible]dging 10,000 cu. yd. sand, silt, stone, [illegible] and boulders in Port Arthur Harbour, to [illegible] Dredge & Dry Dock Co., Ltd., Harb[illegible] Toronto, **87.25c.** per cu. yd. total $8,[illegible] plus, 24,000 cu. yd. sand, silt at Port H[illegible] and 6,200 cu. yd. mud and clay at Wad[illegible] ing, South Bay, to Russell Constr. [illegible] 504 Harbour Comn. Bldg., Toronto, [illegible] per cu. yd. total **$9,480** plus and **74.5c.** per cu. yd., total **$4,619** plus respectively. Gra[illegible] total $22,824. Noted June 3, CD—June [illegible] ENR, under "Port Hope, Ont."

Ontario—Dpt. P. Wks., Ottawa, [illegible]dging Thames River below Chatham, 21,6[illegible] cu. yd. sand and silt floating dredgwork, al[illegible] dredging Thames River mouth, entrance [illegible] channel, incl. 75,000 cu. yd. sand, silt and clay floating dredgwork, to Chatham Dredging & Contg. Co. Ltd., Chatham, **70c** per cu. yd., total **$15,120,** and **32c** per cu. yd., total $24,000 respectively. Est. $16,100 and $2[illegible] respectively. Bids June 14. Noted June 8, CD.

Ont., Byng Inlet—Dpt. P. Wks., Ottawa, dredging to Consolidated Dredging L[illegible], Toronto, **$11** and **70c.** per cu. yd. Est. [illegible] Bids June 17. Noted June 10, CD.

Ont., Oshawa—Dpt. P. Wks., Ottawa, dredging, to J. P. Porter & Sons, Ltd., [illegible] St. Catherine St. W., Montreal, Que., 28[illegible] per cu. yd., total **$100,000** plus. Est. $80,000. Bids June 17. Noted June 10, CD.

P. E. I., Wood Islands North—Dpt. P. Wks., Ottawa, Ont., constructing harbor, to Dominion Constr. Corp. Ltd., 217 Bay St., Toronto, Ont., **$254,144.** Est. $150,000. Estimate for this work was low, further money will have to be provided to complete contr[illegible] next fiscal year. Bids June 14. Noted May 31, CD—June 2, ENR.

UNCLASSIFIED

PROPOSED WORK

★**R. I., Providence**—WHARF—City P. Wks Dpt., S. F. Nolan, engr., City Hall, making plans municipal wharf, Fields Point and stone wall. $2,000,000. P.W.A. allotted $9[illegible]000 grant. Noted Apr. 15, CD—Apr. [illegible], ENR.

Tex., Port Arthur — PARK IMPROVEMENTS—See "Sewerage and Waste Disposal."

★**†Wash., Bremerton**—DISTRIBUTION SYSTEM—Puget Sound Navy Yard, plans approved by congress for electric distribution system, $300,000; extending power lines to Pier Six, $150,000; weight handling and transportation equipment, $60,000; force account. Total $510,000. Work will be carried out this year, with bids asked for materials.

BIDS ASKED

†Calif., Sacramento — RADIO TRANSMITTER BUILDING—July 20, by Con. Q.M., A[illegible] Depot, Sacramento, constructing radio transmitter building.

†Calif., San Francisco—PIER SHED—Post Quartermaster, Fort Mason, San Francisco, taking bids waterproofing all outside walls incl. fire walls Pier Shed 1, Building 48 at Fort Mason.

Calif., San Luis Obispo—FIELD LIGHTING SYSTEM—July 12, by G. B. McDougall, state archt., P. Wks. Bldg., Sacramento, erecting and completing football field lighting system consisting of wood poles, enclosed flood lights and underground wiring, both primary and secondary, for State.

Ga., Marietta—RURAL LINES—Cobb County Electric Membership Corp., c/o C. Hamby, will release for bids June 27, constructing 200 mi. REA lines in Cobb Co. $143,000. J. B. McCrary, 22 Marietta St. Bldg., Atlanta, engr. Noted June 8, CD.

Md., Glenn Dale—LANDSCAPE DEVELOPMENT—July 19, by Dist. Comrs., District Bldg., Wash., D. C., landscape development for Buildings D, E, F and G, etc., at site of Dist. Columbia Tuberculosis Sanatoria near here, Prince Georges Co.; adv. ENR, June 30.

Mo., Jefferson City—ELECTRICAL DISTRIBUTION SYSTEM—State Building Comn., Merchants Bank Bldg., taking bids and will open same in 3 or 4 weeks, electrical distribution system from old penitentiary to new. $30,000. Engineering Service Co., Railway Exch. Bldg., Kansas City, Mo., engrs.

New Jersey — TUNNEL SUPERSTRUCTURES—July 19, at office of General Manager Port of New York Authority, 111-8th Ave., New York, F. C. Ferguson, chm., constructing New Jersey approach steel superstructures between State Hy. Route 3 and Prospect Ave., North Bergen, Lincoln Tunnel Contr. MHT-74; adv. ENR, June 30.

N. Y., Brooklyn—DRYER REPAIRS, etc.—N. Y., Brooklyn — July 8, by President of Brooklyn Boro, repairing Dryer No. 2 at Municipal Asphalt Plant, Hamilton Ave. and 14th St.

N. Y., Flushing — ELECTRICAL WORK—July 15, by New York World's Fair 1939, Inc., Flushing Meadow Park, constructing electrical work for pedestrian overpass to Roosevelt Ave. and I.R.T.-B.M.T. [illegible] Platform and ramps, (I-LJ-1), Prop[illegible]

Unclassified (Continued)

incl. furnishing all tools, equipment and appliances for installing same, and for solenoid operated valves on pedestrian overpass, furnishing, installing conduits for light, power, telephone and low tension work, etc., World's Fair Site, Flushing Meadow Park.

South Carolina — ELECTRIC LINES — July 18, by State Rural Electrification Authority, 1202 Main St., Columbia, constructing Projects S.C. 9D, Parts 1 and 2, incl. 137 mi. and 118.75 mi. lines in Colleton, Clarendon, Newberry, Georgetown, Calhoun, Richland, Florence, Williamsburg, Darlington, Marlboro and Dillon Counties. U. X. Cullum, 1202 Main St., Columbia, engr. Noted June 15, CD.

S. C., Greenwood—CLEARING LAKE AREA—July 15, by Finance Bd. Greenwood Co., Courthouse, clearing trees and brush from lake area of Buzzards Roost Development, Sect. 1, clearing reservoir from dam to Island Ford Bridge east side of river (Newberry Co.) approximately 1,240 acres; Sect. 2, from dam to the Island Ford Bridge west side of river (Greenwood Co.) approximately 867 acres; Sect. 3, from Island Ford Bridge to Watts bridge east side of river (Laurens Co.) approximately 1,144 acres; Sect. 4, from Island Ford Bridge to Watts bridge west side of river (Greenwood Co.) approximately 1,397 acres; Sect. 5, from Watts bridge to Cothrans bridge east side of river (Laurens Co.) approximately 1,727 acres; Sect. 6, from Watts bridge to Cothrans bridge west side of river (Greenwood Co.) approximately 1,107 acres. E. L. Brooks, chn. D. T. Duncan Eng. Co., Ninety Six, engrs.

Ont., Toronto—July 6, by E. L. Cousins, genl. mgr., Harbor Comrs., supplying, installing complete field lighting system at Malton Airport.

Sask., Saskatoon — AIRPORT — A. Leslie, city comr., City Hall, taking bids municipal airport, incl. 100,000 cu. yd. excav., 72 acres grading. G. D. Archibald, City Hall, engr.

LOW BIDDERS

★**New York** — TUNNEL VENTILATION BUILDING—New York City Tunnel Authority, 200 Madison Ave., New York, June 21, constructing Manhattan Ventilation Building at site of ventilation shaft which is being constructed under contract between East 41st and 42nd Sts., east of First Ave., New York, for Queens-Midtown Tunnel, from Caldwell-Wingate Co., 101 Park Ave., New York, $658,000. Noted May 24, CD—May 26, ENR.

N. Y., Brooklyn—BATH HOUSE—Commissioner Parks, Dpt. Parks, Arsenal Bldg., Central Park, 64th St. and 5th Ave., New York, June 21, general contract, constructing bath house and interior finish, demolition of existing bath house, Betsy Head Park, Hopkinson Ave., from Lane Eng. Corp., 103 Park Ave., New York, **$234,682.** Noted June 20, CD—June 9, ENR.

CONTRACTS AWARDED

+**Calif., Mount Shasta**—ANTENNA SYSTEM—Dpt. Commerce, Div. Purchases & Sales, Wash., D. C., constructing antenna system, Pro. 29130, Schedules 1 and 2, to E. Green, 3025 St. George St., Los Angeles. Est. **$5,803.** Bids May 10. Noted Apr. 25, CD—Apr. 28, ENR.

★**Calif., Oakland**—PARK DEVELOPMENTS—Bd. Park Directors, improving city parks and planting 10,000 trees in residential districts, **$783,000;** roads and trails, etc., in Sequoia-Joaquin Miller Mountain Park Areas, **$696,875, W.P.A.** labor. Ultimate expenditure $1,592,676. E. W. Sanborn, City Hall, city forester.

Calif., San Francisco—GENERAL PARK IMPROVEMENTS—See "Roads."

+**Calif., Palmdale** — ANTENNA SYSTEM — Dpt. Commerce, Wash., D. C., constructing tower antenna system, Pro. 29077, to R. J. Kingston, 2557 Brinker Ave., Ogden, Utah. Est. **$10,577.** Bids May 2. Noted Apr. 12, CD—Apr. 14, ENR.

Calif., San Francisco—DRYERS—Dpt. P. Wks., constructing 2 sand and rock dryers for asphalt plant, for City and San Francisco Co., to Link-Belt Co., 400 Paul Ave., **$4,245.** Bids June 15. Noted June 9, CD.

Calif., San Francisco—PILE FOUNDATIONS—California Comn. for Golden Gate International Exposition, 411 Pacific Mutual Life Insurance Bldg., pile foundations for San Francisco Building, entrance to California Court and for California State Building, Treasure Island, in San Francisco Bay, World's Fair site, to M. B. McGowan, Call Bldg., **$1,273** (deduct or add 10c. per ft. over or under 2,000 ft.) Bids June 17. Noted June 9, CD.

Calif., San Francisco—PLAYGROUND IMPROVEMENTS—City, playground rehabilitation, involving grading, walks, club and miscellaneous out buildings, **W.P.A.** labor. **$401,436.** C. Healey, City Hall, assist. city engr.

Calif., San Francisco—POWER SUPPLY—Public Utilities Comn., City Hall, changing electric lighting and minor power supply to City Hall from 12-/240 volt, 3 wire DC to 3 phase, 120/208 volt, 4 wire AC network, Electric Power Bureau Contr. 26, to Department Public Works, Bureau Building Repairs, City Hall, **$2,723.** Bids June 21. Noted June 14, CD.

+**Calif., Silver Lake**—ANTENNA SYSTEM—Dpt. Commerce, Wash., D. C., constructing

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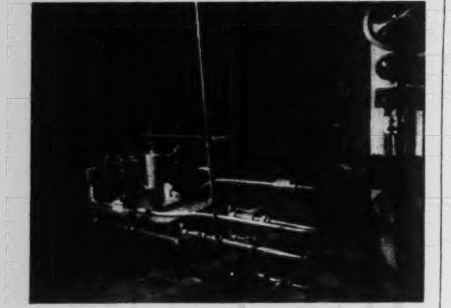

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tower antenna system, Pro. 29077, to O. L. Jackson, Box 864, San Bernandino, est. **$12,551.** Bids May 2. Noted Apr. 12, CD—Apr. 14, ENR.

Conn., New Haven—FIRE WALL, etc.—Atlantic Refining Co., 280 Waterfront St., 7 ft. rein.-con. fire wall and 700,000 gal. capacity steel storage tank, to C. W. Blakeslee & Sons, 58 Waverly St. Est. **$25,000.** Private plans.

†Florida, Georgia and **North Carolina**—ANTENNA SYSTEMS—Dpt. Commerce Div. Purchases & Sales, Wash., D. C., constructing loop antenna systems Dayona Beach, Fla., in Macon, Ga., and in Charlotte, N. C., Pro. 29064, to Americus Eng. Constructing Co., Americus, Ga., est. **$11,432.** Noted Apr. 15, CD—Apr. 21, ENR.

†Fla., Pensacola — RUNWAY — Yards & Docks, Navy Dpt., Wash., D. C., constructing oil-treated runway, Naval Air Station, to Smith Eng. & Constr. Co., Pensacola, **$118,862.**

†Georgia and **South Carolina** — ANTENNA SYSTEM, etc.—Dpt. Commerce, Div. Purchases & Sales, Wash., D. C., constructing antenna system and radio station, Savannah, Ga., and antenna system in Florence, S. C., Pro. 29122, to Americus Eng. Constructing Co., Americus, est. **$7,832.** Bids May 13. Noted Apr. 25, CD.

Ill., Arlington Heights—FIELD HOUSE, etc. —A. H. Park Dist., constructing field house and swimming pool, **W.P.A.** labor. **$75,000** approved.

Ind., South Bend—STADIUM—Bd. Educ., stadium, 5,800 seating capacity, at School Field, **W.P.A.** labor. **$102 000.** W.P.A. allotted 83% of cost, city 17%.

Ia., Burlington—FIELD HOUSE—Independent School Dist. Bd., constructing field house, to Hufford Constr. Co., Mutual Bldg., Kansas City, Mo., **$49,293.** Awarded June 14.

†Mass., North Truro—FINDER STATION—Public Works Officer, Boston, miscellaneous repairs and improvements at Naval Direction Finder Station, to F. A. Days & Sons, 24 Pearl St., Provincetown, **$4,043.** Bids June 1. Noted May 31, CD.

Mont., East Helena—CHIMNEY—American Smelting & Refining Co., J. D. McKenzie, mgr., Helena, constructing 400 ft. concrete chimney at its smelter here, day labor.

Nebraska—TRANSMISSION LINES—North Loup Public Power & Irrigation Dist. Ord, constructing 16 mi. 34.5 KV power lines, to Jensen Constr. Co., Kimballton, Ia. **$39,453.** Bids June 4. Noted May 26, CD.

Neb., North Platte—AIRPORT IMPROVEMENTS—City, constructing airport improvements and extending runways, **W.P.A.** labor. **$61,325.** W.P.A. allotment approved.

N. J., Jersey City—CARRIER SYSTEM—Pub. Service Electric & Gas Co., 80 Park Pl., altering commercial office building consisting mainly of electric work, carrier system, manholes, etc., to George Seigler Co., 24 Journal Square, **$21,000.** Awarded June 13.

†New York—GAME RESERVE—Dpt. Agriculture, Wild Life Div., Wash., D. C., development of wild life refuges in various parts of New York State, own forces. Funds appropriated.

New York—RAIL REMOVAL—Lehigh Valley R.R. Co., E. J. Cullen, ch. engr., Bethlehem, Pa., removing rails between Horseheads and Van Etten, involving 2,600 tons rails, own forces. Est. exceeds **$25,000.**

N. Y., Brooklyn — FIELD HOUSE, etc. — Dpt. Parks, Arsenal Bldg., Central Park, New York, 1 story, brick field house and comfort station on 42x89 ft. plot at 1357 Fillmore Ave., **W.P.A.** labor. **$40,000.** Noted June 15, CD—June 23, ENR.

N. Y., New York—PARK IMPROVEMENTS —Commissioner Parks, Dpt. Parks, Arsenal Bldg., Central Park, 64th St. and 5th Ave., park improvements, incl. grading, tennis courts, topsoiling, walks, fences, incidental structures, Rice Memorial, Pelham Bay Park, Bronx Boro, Contr. X-39-137, to Burtsell J. Kearns, Inc., 2254 Sedwick Ave., **$43,421.** Bids June 16. Noted June 7, CD—June 9, ENR.

N. Y., New York — SWIMMING POOL — Dpt. Parks, Arsenal Bldg., Central Park, new outdoor swimming pool, East 28th St., **W.P.A.** labor. **$39,480.** Noted May 13, CD—May 19, ENR.

N. Y., New York — SWIMMING POOL — Dpt. Parks, Arsenal Bldg., Central Park, new outdoor swimming pool, East 60th St., **W.P.A.** labor. **$53,880.** Noted May 13, CD—MAY 19, ENR.

N. Y., New York — SWIMMING POOL — Dpt. Parks, Arsenal Bldg., Central Park, new outdoor swimming pool, 342 East 54th St., **W.P.A.** labor. **$55,280.** Noted May 13, CD—May 19, ENR.

N. Y., Utica—CONDUIT COVER—Bd. Contr. & Supply, constructing concrete top on Nail Creek Conduit, to Mid-State Builders, Inc., 622 South Ave. Est. **$33,000.** J. B. Shaw, city engr.

O., Cuyahoga Falls—SWIMMING POOL—City constructing first regulation olympic pool, 100 meters long and modern in every detail, in this section of country, to be installed at Waterworks Park, **W.P.A.** labor. **$100,000.** W.P.A. approval has been given $62,612 for project.

O., Paulding — RURAL LINES—[illegible] Putnam Electric Cooperative constr[illegible] mi. rural electric distribution lines [illegible] Hydaker Co., Spencerville. **$95,838.** [illegible] 000. Bids May 6.

O., Tiffin—RURAL LINES—North Central Farm Bureau Cooperative constructing 160 mi. rural electrification lines in eastern Seneca Co., to Superior Constr. Co., Youngstown, **$102,242.** Noted Mar. 10, CD—Mar. 17, ENR.

Oklahoma—GAS PIPE LINE—State Planning & Resources Bd., Oklahoma City, removing and relaying 21,286 lin. ft. 8 in. gas [illegible] across Fort Supply reservoir site, to [illegible] & M Constr. Co., Perrine Bldg., Oklahoma City, **$23,678.** Est. $25,000. Bids June 7, Awarded June 13. Noted May 25, CD.

Okla., Ada—RURAL ELECTRIC LINES—Interstate Co-operative Electric & Power Co., c/o E. U. Jones, pres., constructing [illegible]30 mi. rural electric lines, to Sheehan Pipe Line Constr. Co., Natl. Bank Tulsa Bldg., Tulsa, **$95,843.** Est. $100,000. Bids May 20. Former contract rescinded. Noted May 27, CD—June 2, ENR., under "Contracts Awarded."

★ **†Wash., Bremerton**—GRAVING and DRY DOCK—U. S. Navy Dpt., Wash., D. C., constructing graving and dry dock, 1,000 ft. long, 37 ft. wide, 52 ft. deep with concrete walls and bottom ranging in thickness from 8 to 15 ft., crane track included. **$4,500,000,** power plant **$450,000,** shipbuilding dock $100,000, foundry building **$300,000,** force account. Grand total $5,350,000. Work will be started this year, with bids asked for materials.

Wash., Buckley — GROUND IMPROVEMENTS — State Dpt. Finance, Budget & Business, Olympia, improving grounds of State Custodial School, by constructing large septic tank, with sludge and filter beds, necessary pipe installations, tile and fittings, covered arcade, new water mains, hydrants, landscaping, painting, constructing roads, relief labor under $78,821 **W.P.A.** allotment. **$103,358.** Noted May 18, CD.

Wash., Waterville—RACE TRACK—Douglas Co., resurfacing race track, constructing sewerage system, rest rooms, 2 livestock exhibition buildings, repairing fences, grandstand and stables, relief labor under $12,401 **W.P.A.** allotment. $28,302. F. Thomas, Courthouse, engr.

Wash., Wenatchee—AIRPORT IMPROVEMENTS—City, improving airport by extending runway 1,500 ft. and constructing 60x80 ft. hangar, **W.P.A.** labor. **$46,098.** [illegible] J. Dunstan, City Hall, engr.

Alta., Cowley—AIRPORT DEVELOPMENT —Dpt. Transport, Ottawa, Ont., airport development, to Western Canada Constr. Ltd., 18 Dominion St., Edmonton. Est. **$25,000.**

Alta., Lethbridge—RUNWAYS—Municipality constructing hard surfaced runways at Municipal airport, incl. 20,000 cu. yd. excav., 27,300 cu. yd. crushed gravel with clay binder, 1,600 cu. yd. rock chips, to Western Canada Constr. Ltd., 18 Dominion St., Edmonton. Est. **$51,000.** Awarded June 15. Noted June 3, CD.

B. C., Vancouver—CLEARING and GRADING AIRDROME — Dpt. National Defense, Ottawa, Ont., clearing, grading at Royal Canadian Air Force airdrome at Patricia Bay, near here, to Mannis & Davidson, Vancouver, **$69,500.** Awarded June 21. Major H. Maple, Ottawa, Ont., engr.

N. S., Dartmouth—GRADING RUNWAYS —Dpt. National Defense, Ottawa, Ont., grading runways at Royal Canadian Air Force Station, to Acadia Constr. Co., Ltd., Halifax, **$240,000.** Awarded June 21. Major H. Maple, Ottawa, Ont., engr.

Ont., Port Stanley—PIER—Dpt. P. Wks., Ottawa, Ont., reconstructing West Pier, to Wainwright Constr., Ltd., 958 Richmond St., London, **$40,000.** Bids June 16. Noted June 9, CD.

Que., Grande Rivere — WHARF — Dpt. P. Wks., Ottawa, Ont., repairing, rebuilding and widening wharf, to P. and A. Belanger, Sayabee, **$46,667.** Est. $50.000. Bids June 15. Noted June 3, CD—June 9, ENR.

MATERIALS, EQUIPMENT

PROPOSED WORK

TANDEM ROLLER—**Fruitvale, Calif.**—State Purch. Agent, 219 State Capitol, Sacramento, plans purchasing one 3-3½ tandem roller, gasoline engine powered, 2 speeds in each directoin, complete with towing attachment, Req. 13,018, delivered Fruitvale.

AIR COMPRESSOR, etc.—**Merced, Calif.**—City Council plans purchasing air compressor and accessories.

CAST IRON WATER PIPE—**Merced, Calif.** —City Council plans purchasing 770 lin. ft. Class 150, 4 in. B and S c.i. water pipe together with necessary fittings.

MOTOR GRADER—**Merced, Calif.** — City Council plans purchasing motor grader.

MOTOR GRADER—**Oakland, Calif.**—State Purchasing Agent, 319 State Capitol, Sacramento, plans purchasing one 10 ft. dual-drive Diesel-powered motor grader with scarifier and oil mix moldboard for State Hy. Shop 4, Fruitvale, Requisition 13,183.

MOTOR TRUCKS—**Oakland, Calif.**—Playground Directors, 315 City Hall, plans purchasing 2 motor trucks for Recreation Dpt.

Materials, etc. (Continued)

ASPHALTIC CONCRETE MIX, etc.—**Sacramento, Calif.**—City Council, plans purchasing 1,[illegible] tons asphaltic concrete mix, 1,000 tons stabilized asphaltic mixture.

WHITE TRAFFIC LACQUER—**Sacramento, Calif.**—City Council, H. G. Denton, clk., plans purchasing 1,500 gal. white traffic lacquer for Street Dpt.

AIR COMPRESSOR—**San Francisco, Calif.**—Light House Service, 425 Customhouse, plans purchasing air compressor, horizontal type, 133 cu. yd. capacity at 40 lb. gage pressure, electric motor, Inv. 2993.

★ STEEL BATTLESHIPS—**Wash., D. C.**—Navy Dpt., Wash., D. C., will advertise for bids about July 1 for 2 to 4 steel battleships. $70,000,000 each.

★ STEEL SHIPS—**Wash., D. C.**—Maritime Comn., Wash., D. C., soon advertises for bids constructing 24 steel vessels for Pacific Coast Shipping Service. $100,000,000.

TANKS—**St. Louis, Mo.**—Adele Schulte, c/o 7209 Lansdowne Ave., applied to Bd. Pub. Serv. for permit to install one 20,000 gal. tank for gasoline above ground and one 2,000 gal. steel tank underground for automobile filling station at 7209 Lansdowne Ave.

TANKS—**St. Louis, Mo.**—St. Louis Casket Co., 1821 Chouteau Ave., applied to Bd. Pub. Serv., for permit to install one 1,000 gal. and two 560 gal. underground steel tanks for gasoline for automobile filling station, at 1906 Chouteau Ave.

TANKS—**St. Louis, Mo.**—Standard Oil Co. of 314 North Jefferson Ave., applied to Bd. Pub. Serv. for permite to install three 1,000 gal. underground steel tanks for gasoline use in automobile filling station at 1452-54 Chambers St. and for installation of three 1,000 gal. underground steel tanks for gasoline for automobile filling station at 2009 Gravois Ave.

CONCRETE MIXING PLANT—**Trenton, N. J.**—Hamilton Twp. Com., 2090 Greenwood Ave., will readvertise for bids mixing plant with pit hopper, ramp storage bins, motors and storage tanks. Bids June 14 rejected. J. L. O'Rourke, 2090 Greenwood Ave., engr. Noted June 9, CD.

LIGHTING EQUIPMENT—**Binghamton, N. Y.**—New York State Electric & Gas Corp., 62 Henry St., plans purchasing lighting fixtures, reflectors, bulks, etc., in connection with $230,000 lighting system improvement program. To exceed $1,000.

SEWER PIPE, etc.—**Boonville, N. Y.**—Village Bd. Trustees, Village Hall, plans purchasing sewer pipe. $7,000, and other materials for use in connection with W.P.A. sewer project. $19,000.

STORAGE TANKS—**Buffalo, N. Y.**—Socony-Vacuum Oil Co., Genesee Bldg., plans purchasing steel gasoline storage tanks, 4,000 gal. total capacity, and pumping equipment for gasoline service station at 168 Delaware Ave. To exceed $1,000. Private plans.

SEWER PIPE—**Endicott, N. Y.**—Bd. Trustees, C. F. Hunt, village engr., plans purchasing additional quantity vitr. clay sewer pipe for W.P.A. project in Andrews Ave. To exceed $1,000.

CEMENT, etc. — **Newburgh, N. Y.** — City plans purchasing large quantities of cement, sand, stone and stone curbing for large W.P.A. sidewalk, etc., projects. **Maturity probably later in 1938.**

ROAD OIL—**Niagara Falls, N. Y.**—City, W. Robbins, city mgr., City Hall, soon takes bids additional 15,000 gal. road oil. $1,500. H. W. Clark, city engr.

PORTLAND CEMENT, SAND, etc.—**Portland, N. Y.**—Town Bd., J. S. Dunham, superv., soon takes bids portland cement, sand, gravel, stone and other materials for sidewalk repair and construction project in Portland and Brocton. $3,000.

BRICK—**Schenectady, N. Y.**—Dpt. P. Wks., City Hall, plans purchasing 170,000 brick for proposed W.P.A. sewer project. $1,000 or more.

LUMBER—**Schenectady, N. Y.**—Dpt. P. Wks., City Hall, plans purchasing 40,000 ft. lumber in connection with proposed $900,000 sewers and sewage disposal plant project. To exceed $1,000. L. C. Purdy, city engr.

BITUMINOUS MATERIALS—**Utica, N. Y.**—City, City Hall, plans purchasing bituminous materials for W.P.A. paving projects. To exceed $1,000. J. B. Shaw, City Hall, engr.

FIRE TRUCK—**Waverly, N. Y.**—Village postponed purchasing new fire truck until 1939, for financial reasons. $1,700.

FIRE APPARATUS—**Cedarville, O.**—Village plans purchasing new fire apparatus.

FIRE PUMPER—**Orrville, O.**—Village Council authorized bids for cab style pumper, 200 gal. rotor gear pump, 350 centrifugal direct drive pump, 100 gal. booster tank, 200 ft. in. hose, 22 ft. extension ladder and 12 ft. roof ladder. $35,000. Noted Mar. 1, CD—Mar. 3, ENR.

FIRE PUMPER—**Sandusky, O.**—City, approved $6,000 bond issue to purchase new fire pumper. $6,000. L. J. Wager, city mgr.

HOLLOW STEEL, etc.—**Portland, Ore.**—U. S. Eng., Pittock Bldg., Portland, soon takes

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Materials, etc. (Continued)

bids 1,400 ft. plow steel, 13 gage cocks and 4 safety water columns and c.i. ladder head half bushings for use on government moorings at St. Helens.

STREET SIGNS, etc.—**Portland, Ore.**—City soon takes bids 3,000 metal street signs and 2,050 metal clips.

AMMONIATOR—**Danville, Pa.**—Boro Council, plans purchasing, installing ammoniator at municipal water supply plant, also pumping equipment for well now being drilled in Susquehanna River to augment water supply. $1,000. **Maturity soon.**

PUMPS, etc.—**Ephrata, Pa.**—Borough Council plans purchasing electrical pumping machinery, settling tanks, sludge digesters and other equipment for sewage disposal plant, also various size sewer pipe for sewerage system. To exceed $1,000. W. A. Goff, 220 South 16th St., Phila., engr.

FIRE TRUCK—**Reno, Pa.**—Village Bd., Reno, organizing volunteer fire department and will purchase modern motor pumper fire truck, equipped with chemical and booster tanks, pump, hose and auxiliary equipment. $4,000. **Maturity soon.**

BULLDOZER—**Kelso, Wash.**—Cowlitz Co., rejected bids June 14 for bulldozer. New bids will probably be asked. To exceed $1,000. F. Cramer, Courthouse, engr. Noted June 6, CD.

STEEL WATER PIPE—**Seattle, Wash.**—King Co. Water Dist. 53, c/o Parker & Hill, engrs., Smith Tower, soon takes bids 2 mi. 4- to 6-in. steel water pipe. $15,000.

OIL and GAS DRILLING EQUIPMENT—**Cockburn Island, Ont.**—G. F. Gregory & Son, Petrolia, interested in prices of drilling equipment for extension drilling operations for oil and gas, here.

PUMPS—**Kitchener, Ont.** — Water Comn. wants prices 2 electrically driven pumps, total capacity 1,000,000 imperial gallons. M. Pequegnat, City Hall, supt.

MACHINERY — **Regina, Sask.** — General Motors of Canada, Ltd., J. B. Highfield, plant mgr., Oshawa, Ont., making plans purchasing and installing machinery at plant here. $75,000. Private plans.

TURBINE GENERATOR — **Ketchikan, Alaska**—Ketchikan Public Utilities plans installing new turbine generator with connecting tunnel to provide additional current facilities. $50,000.

BIDS ASKED

†GALVANIZED STEEL PIPE, etc.—**California**—State Procurement Office, U. S. Treas. Dpt., 49-4th St., San Francisco, taking bids 2,100 ft. 1¼ in. galvanized steel pipe, T and C, delivered Fort Scott, San Francisco, Inv. 5696; 750 tons liquid asphalt, type SC-2, at Vendor's plant in or near Bakersfield, Inv. 5694; 800 tons liquid asphalt, type SC-2, delivered at Vendor's Refinery, alternate bid, 400 tons delivered Visalia, and 400 tons delivered Dinuba, Inv. 5695.

PORTLAND CEMENT — **California** — State Procurement Office, U. S. Treas. Dpt., 49-4th St., San Francisco, taking bids 600 sacks cement delivered to Yuba City, Inv. 5579; 600 sacks, Redding, Inv. 5580; 900 sacks, San Francisco, Inv. 5581; 600 sacks, Sacramento, Inv. 5582; 600 sacks, Oroville, Inv. 5583; 3,940 sacks, San Francisco, Inv. 5584; 1,200 sacks, Tudor, Inv. 5585; 277 bbl. cement, Lodi, Inv. 5586; 1,200 sacks, Sacramento, Inv. 5587; 3,500 sacks, San Francisco, Inv. 5588; 360 bbls. cement, Turlock, Inv. 5589; 600 sacks, Orland, Inv. 5590.

REINFORCING STEEL BARS, etc.—**California**—State Procurement Office, U. S. Treas. Dpt., 49-4th St., San Francisco, taking bids furnishing 200 CWT ¾ in. reinforcing bars, f.o.b. Oakland, Inv. 5591; 750 pcs. zinc coated steel sheets, corrugated, 27½ in. by 60 in. to 27½ in. x 108 in., 26 and 28 ga., f.o.b. Monterey, Inv. 5594; 1,700 lin. ft. 4 in. Class 150, c.i. pipe, f.o.b. Sacramento, Inv. 5595; 5,990 lin. ft. 6 in. c.i. pipe, Class 150, cement lined, f.o.b. Oakland, Inv. 5597; 700 lin. ft. 12 in. clay sewer pipe, f.o.b. Visalia, Inv. 5593; 750 tons liquid asphalt, Type SC-2, f.o.b. Bakersfield, Inv. 5608; 800 tons same, f.o.b. vendor's refinery or tank cars at Vasalia, or tank cars Dinuba, Inv. 5609; 81 tons same, f.o.b. tank cars, vendor's refinery or Salinas, Inv. 5610; 91 tons liquid asphalt (50-60), Type SC-1A, f.o.b. vendor's refinery or Planada, Inv. 5611.

†BOILER, etc.—**Mare Island, Calif.**—Yards & Docks, Navy Dpt., Wash., D. C., taking bids 120,000 lb. per hr. boiler with water cooled walls superheater, air preheater combination oil and gas burners, forced and induced draft fans, combustion air ducts, soot blowers, structural steel supports and accessories for Mare Island, Spec. 8807.

†INSULATORS, etc.—**Oakland, Calif.**—U. S. Forest Service, Government Island, taking bids 20,000 glass or porcelain insulators, Inv. 5892; 3,000 split bolt type connectors, Inv. 5894, f.o.b. Government Island.

†STEEL FORMS, etc.—**Oakland, Calif.**—U. S. Forest Service, Govt. Island, taking bids 2 sets steel forms for round nose piers for Alder Creek and Laymans Bar Bridge, f.o.b. Placerville and Blairsden, Inv. 5850; one 130 ft. steel truss for Island Bar Bridge, f.o.b. Oroville, Inv. 5851; one 40 ft. steel span Island Bar Bridge, f.o.b. Oroville, Inv. 5855; birch and pine lumber and panels, f.o.b. Government Island, Inv. 5817; structural Douglas fir lumber for Glen Alpine Bridge, f.o.b. Placerville, Inv. 5857; [illegible] ft. beam span for Glen Alpine Bridge, f.o.b. Placerville, Inv. 5862.

†OSCILLATING PUMPS — **San Francisco, Calif.**—U.S. Eng., 401 Customhouse, [illegible] bids 2 oscillating pumps, Inv. 868-38-[illegible]

PIPE—**San Francisco, Calif.**—T. A. Brooks, city purch. agt., 270 City Hall, taking bids vitrified salt-glazed pipe for San Francisco (Mills Field) Airport, W.P.A. project, Inv. 2046. To exceed $1,000.

VITRIFIED CLAY PIPE—**San Francisco, Calif.**—T. A. Brooks, city purch. agt., 270 City Hall, taking bids furnishing extra strength vitr. clay pipe for San Francisco Airport (Mills Field), Inv. 2047.

CAST IRON PIPE—**Hartford, Conn.**—July 5, by Bd Contr. & Supply, Metropolitan Dist. Comn., furnishing bell and spigot water pipe Contr. 37, as follows, 3,000 ft. 6 in. centrifugally c.i. pipe Class 150, 53.7 tons 6 in. pit cast pipe, AWWA, Class C; 8,000 ft. 8 in. centrifugally c.i. pipe Class 150; [illegible] tons 8 in. pit cast pipe, AWWA, Class C; [illegible] ft. 12 in. centrifugally c.i. pipe Class 150; [illegible] tons 12 in. pit cast pipe, AWWA, Class C; 2,000 ft. 16 in. centrifugally c.i. pipe Class 150; 143.8 tons 16 in. pit cast pipe, AWWA Class C.

RAILROAD GRADE CROSSING PROTECTIVE DEVICES—**Delaware**—July [illegible], by Reading Co., C. Dillenbeck, ch. engr., Reading Terminal, Phila., Pa., necessary materials for 7 railroad grade crossing protective devices, to be installed under Federal Grade Crossing Program.

†DREDGE-DIPPER LIPS, etc. — **Wash., D. C.**—July 8, at office General Purchasing Officer Panama Canal, Wash., D. C., dredge dipper lips, concrete reinforcement bars, fencing material, rigid steel conduit, wire rope, power cable, telephone cable, insulated wire, magnet wire, flexible lamp cord, etc. Schedule 3364.

†MARINE BOILER PLATE STEEL, etc.—**Wash., D. C.**—July 5, by Bureau Supplies & Accounts, Navy Dpt., Wash., D. C., [illegible] and 16,000 lb. marine boiler plate steel, Schedule 3754; pig iron, ferro silican steel bars, thermometers; **July 8,** electric transformers, vent heaters.

†HOISTS—**Wash., D. C.**—July 12, by Navy Dpt., Bureau Supplies & Accounts, hoists, electric, whip, wire rope, eye, suspension, trolleys and spare parts, electrical; 6 hoists trolleys to suit six hoists.

†OIL and WATER SEPARATORS, etc.—**Wash., D. C.**—July 19, by Bureau Supplies & Accounts, Navy Dpt., Wash., D. C., separators, oil and water, and spare parts. To exceed $1,000.

†PUMPS—**Wash., D. C.**—July 12, by Bureau Supplies & Accounts, Wash., D. C., pumps, turbine, motor driven. To exceed $1,000.

†RAFT PARTS, etc.—**Wash., D. C.**—July 15, at office General Purchasing Officer, Panama Canal, Wash., D. C., raft parts, electric motors, towing machines, elevating parts, Schedule 3363.

†TUBING STEEL—**Wash., D. C.**—July 22 by Navy Dpt., Bureau Supplies & Accounts, Wash., D. C., tubing steel, seamless, black, delivery 90 days after date of contract.

†MATTRESS LUMBER—**Iowa**—July 6, by U. S. Eng., City Natl. Bank, Omaha, Neb., 1,000,000 FBM mattress lumber, f.o.b. [illegible] ham Spur; 1,000,000 FBM mattress lumber, f.o.b. Onawa.

PLUMBING, HEATING SUPPLIES, etc.—**Boston, Mass.**—July 8, by City, Dpt. School Buildings, J. J. Mahar, supt. construction, [illegible] Norman St., furnishing plumbing, heating and electric supplies, lime, cement, plaster, terra cotta, lockers, wood and steel finish, hardware, etc. in connection with W.P.A. work at Joyce Kilmer and Patrick F. Gavin Schools in West Roxbury.

ROAD OIL and CUTBACK ASPHALT—**Waseca, Minn.**—July 11, by A. Brisbane, aud., Waseca Co., carload lots of road oil and cutback asphalt.

†DIESEL ENGINE—**Vicksburg, Miss.**—July 8, by U. S. Eng., P. O. Box 60, marine diesel engine.

†TRACTORS—**Vicksburg, Miss.**—June 8, U. S. Eng., P. O. Box 60, tractors.

†LUMBER—**Kansas City, Mo.**—July 15, by U. S. Eng., Manufacturers Exchange Bldg., [illegible] MFBM fir lumber, 5 MFBM white pine lumber, and small quantities different kinds lumber, Inv. 461-38-439. $1,200.

†GATE VALVES, etc. — **Omaha, Neb.** — July 5, by U. S. Eng., City Natl. Bank, 11 gate valves, 1 globe valve, 12 angle valves, 3 check vales, elbows, tees, 1,500 ft. steel black pipe, 1,420 ft. steel galvanized pipe, f.o.b. Omaha.

†GENERATOR SETS—**Portsmouth, N. H.**—July 5, by Bureau Supplies & Accounts, Navy Dpt., Wash., D. C., 12 motor generator sets, control and voltage regulator appliances, Schedule 3772; **July 12,** 10 air operated whistles, 11 whistle valves, 10 diaphragms, Schedule 3786, for Portsmouth Navy Yard.

Materials, etc. (Continued)

PARKING METERS—**Auburn, N. Y.**—City taking bids installing parking meters in downtown section on self-liquidating basis. To exceed $1,000. City Manager will place contract.

TILE SILO—**Hudson, N. Y.**—July 14, by New York State Dpt. Social Welfare, 112 State St., Albany, tile silo for State Training School for Girls. To exceed $1,000. T. F. Farrell, State Bldg., Albany, engr.

GRAVEL DRESSING—**Lakewood, N. Y.**—Town Bd., Busti Twp., Town Hall, Lakewood, taking bids (before July 5), gravel dressing to improve approximately 5 mi. township dirt roads. $8,987. Noted June 7, CD—June 16, ENR.

CAST STEEL CONTACT SHOES, etc.—**New York, N. Y.**—July 7, by Bd. Transportation, 250 Hudson St., furnishing, delivering cast steel contact shoes for Independent City-owned Rapid Transit R.R. System; furnishing, delivering carbide for mine lamps for Independent City-owned Rapid Transit R.R. System.

REPAIRING FIELD COILS, etc. — **New York, N. Y.**—July 8, by Bd. Transportation, 250 Hudson St., repairing field coils for subway car motors for Independent City-owned Rapid Transit R.R. System.

AERIAL FIRE TRUCK—**Rome, N. Y.**—City, City Hall, S. E. Townsend, Jr., comr. P. Wks., taking bids furnishing an aerial fire truck. $18,000. Noted June 15, CD—June 23, ENR.

CEMENT—**Syracuse, N. Y.**—Contract & Purchase, City Hall, taking bids portland cement for city's requirements during third quarter 1938. To exceed $1,000.

SILO—**Utica, N. Y.**—July 13, by New York State Dpt. Mental Hygiene, State Bldg., Albany, silo for Utica State Hospital. To exceed $1,000. T. F. Farrell, State Bldg., Albany, engr.

CRAWLER TRACTOR — **Ohio** — July 5, by P. V. Goodman, purch. agt. State Hy. Dpt., Columbus, 4 crawler tractors not less than 44 hp. and drawbar, powered by 3, 4 or 6 cylinder diesel type engine, equipped with necessary accessories.

DYNAMITE, etc.—**Cleveland, O.**—July 8, by City, C. B. Patterson, purch. agt., dynamite, electric meters.

DUST COLLECTOR SYSTEM—**Columbus, O.**—July 7, by L. L. Lewis, city purch. agt., furnishing one dust-collector system. $1,300.

ROAD OIL—**Marion, O.**—June 30, by Bd. Comrs. Marion Co., J. A. Raub, clk., furnishing, applying 96,460 gal. more or less road oil. $4,630. C. H. Tozzer, city engr.

REINFORCING STEEL—**Wilkes-Barre, Pa.**—July 5, by L. C. Eldridge, city clk., City Hall, furnishing as required to Jan. 1, 1939, steel reinforcing bars and wrought iron bars for various W.P.A. and other Federal-aid projects in progress or about to be started by city. To exceed $1,000. W. P. Johns, City Hall, city engr.

†GLAZED TILE — **Knoxville, Tenn.** — July 15, by Tennessee Valley Authority, Knoxville, structural glazed tile for Guntersville Powerhouse. C. H. Garity, dir. Purchases; adv. ENR June 30.

†TRANSMISSION TOWERS and ACCESSORIES — **Knoxville, Tenn.** — July 12, by Tennessee Valley Authority, Knoxville, furnishing, fabricating, galvanizing and delivering double circuit steel transmission towers and accessories for Chickamauga-Guntersville 154 kv. transmission line. C. H. Garity, dir. Purchases; adv. ENR June 30.

DYNAMITE, etc.—**Austin, Tex.**—July 8, by State Bd. Control, c/o C. Teer, chn., dynamite, oils, lubrication, paints and pipe fittings, power plant supplies, rock drill bits, etc.

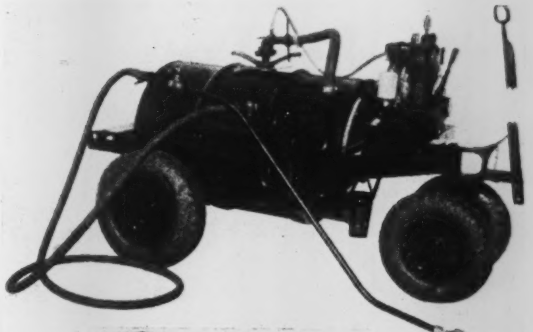
†STEEL, etc.—**Bremerton, Wash.**—July 11, by Supply Officer, Puget Sound Navy Yard, 4,000 lb. medium black bar steel, grade M, round, welding quality 16 to 20 ft. long, weighing 8.18 lb. per ft., Req. 9/9540; 1,200 lb. naval rolled brass, finished, bar, round, half-hard, Type 2, size 7/8 in., weighing 2,218 lb. per ft.

†STEEL RODS, etc.—**Bremerton, Wash.**—July 8, by Supply Officer, Puget Sound Navy Yard, 348 lb. corrosion resisting steel rods, 820 gross brass machine screws, 547 lb. aluminum alloy bars, 575 lb. dry litharge pigments, 1,400 lb. iron and steel bare or copper-coated welding rods.

TRUSS SPANS—**Seattle, Wash.**—July 11, by J. R. Ummel, purch. agt., Alaska R.R., Federal Office Bldg., Seattle, two single track 125 ft. steel through truss spans for erection of Alaska RR. over the Matanuska River in Alaska, each span consists of 2 trusses with bearing plates, bases, roller nests, shoes, floor beams, stringers, bracing, etc. To exceed $1,000.

GENERATING EQUIPMENT — **Richland Center, Wis.**—July 5, by City, 1,250 kw. steam turbine condenser and auxiliaries. H. C. Carroll, 307 North Michigan Ave., Chicago, Ill., engr. Noted June 15, CD—June 23, ENR.

BITUMINOUS ASPHALT—**Lethbridge, Alta.**—J. T. Watson, engr., City Hall, in market for bituminous asphalt sufficient for 123,000 sq. yd., for Municipality.



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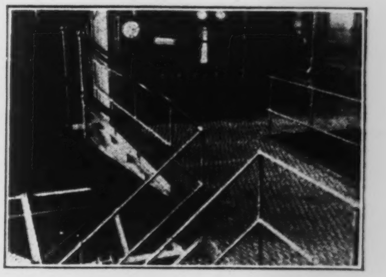

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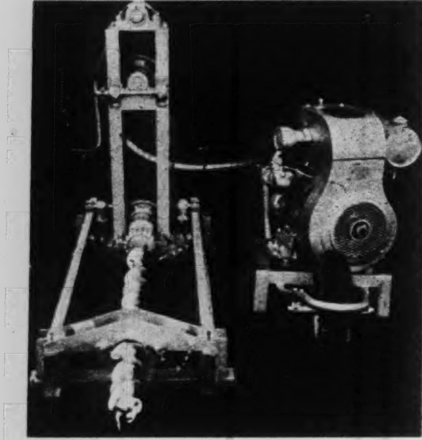

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Materials, etc. (Continued)

GASOLINE TANKS, etc.—**Leamington, Ont.**—G. Church, 7 Clark St. E., in market for steel gasoline tanks, pumps, and other service station equipment. To exceed $1,000. T. C. Warwick, Blenheim, engr.

WATER HEATERS—**Swansea, Ont.**—Municipality, c/o R. J. Wallace, 15 Morningside Ave., taking bids supplying, installing 240 water heaters.

GASOLINE TANKS, etc.—**Quebec City, Que.**—J. Vaillancourt, 52 St. Anselme St., in market for steel gasoline tanks, double pump and other service station equipment. To exceed $1,000.

PUBLIC BUILDINGS

PROPOSED WORK

★**Ga., Atlanta**—State, c/o C. Roberts, Dpt. Markets & Agriculture, State Capitol, plans farmers market building on 15 acre site, on Murphy Ave. S.W. $1,000,000. Robert & Co., Bona Allen Bldg., consult. archts. T. Firth Lockwood, Murrah Bldg., Columbus, archt. Noted June 15, CD.

★**Mass., Saugus**—Town, V. W. Evans, chn. Building Com., Town Hall, plans by J. Williams Beal Sons, 185 Devonshire St., Boston, 3 story, basement, irregular sized, brick, steel, stone Senior High School. $700,000. P.W.A. allotted $280,000 grant Noted June 7, CD—June 9, ENR.

★**Mo., St. Joseph**—St. Joseph Public School Dist., c/o Bd. Educ., plans by P. M. Lowry, 10th and Felix Sts., and soon takes bids constructing school buildings and additions to existing building, brick, concrete construction. $900,000. P.W.A. allotted $405,000 grant.

★**N. J., Irvington**—Town, Town Hall, plans municipal center consisting municipal building, about $535,000, incl. land and equipment, library $200,000, including equipment, hospital addition $175,000, school system improvement also contemplated. Total est. $910,000. I. J. Casey, Jr., town engr.

★**N. J., Paterson** — Bd. Educ., City Hall, plans by Lee & Hewitt, 152 Market St., 3 story, basement, 200x280 ft., brick, limestone, terra cotta grade school, incl. 40 classrooms and gymnasium and domestic science rooms, Totowa and Sherman Aves. $650,000.

★**N. Y., Binghamton**—City, City Hall, plans by W. H. Whitlock, 607 Chenango St., constructing new city hospital. $850,000. P.W.A. allotted $382,500 grant.

★**N. Y., Delhi**—Bd. Educ., Central School Dist., plans school. $676,300. P.W.A. allotted $304,335 grant. A. F. Gilbert, 358-5th Ave., New York, archt. Noted June 21, CD—June 23, ENR.

★**N. Y., Elmira**—Bd. Educ. plans by Haskell & Considine, Hulett Bldg., 3 schools. $879,670. P.W.A. allotted $395,852 funds for same. Noted Sept. 29, CD—Oct. 7, ENR.

★**N. Y., Greenburg (P. O. Tarrytown)**—Town of Greenburg, plans remodeling various schools. $525,000. P.W.A. allotted $236,250 grant.

★**N. Y., Kenmore**—Kenmore Union Free School Dist., Township of Tonawanda, P. O. Kenmore, plans by Kidd & Kidd, 524 Franklin St., Buffalo, school. $1,609,000. P.W.A. allotted funds for same. Noted July 7, 1937, CD—July 15, 1937, ENR.

★**N. Y., Middletown**—Bd. Educ. plans school. $789,225. P.W.A. allotted $359,201 grant. Noted Nov. 22, CD—Nov. 25, ENR.

★**N. Y., Pulaski**—Central School Dist. plans by H. O. Fullerton, 152 Washington Ave., Albany, 2 story school. $600,000. P.W.A. allotted $301,000 grant. T. Burch, pres. Bd. Educ. Noted June 27, CD.

★**N. Y., Rome**—City, City Hospital, plans hospital $525,000. P.W.A. allotted $236,250 grant. Bagg & Newkirk, 258 Genesee St., Utica, and H. G. Rice, 112 West Dominick St., archts. C. F. Neergaard, 512-5th Ave., New York, hospital consultant. Noted May 24, CD—May 26, ENR.

★**N. Y., Utica** — Utica Municipal Housing Authority, Natl. Bank Bldg., plans by Kinne, Jennison & Pennock, Hopper St., Utica, housing project. $1,000,000. U.S.H.A. project. Noted Apr. 4, CD—Apr. 7, ENR.

★**N. Y., White Plains**—Bd. Educ. plans school improvements. $700,000. P.W.A. allotted $315,000 grant.

★**O., Columbus** — Columbus Metropolitan Housing Authority, O. A. Corzilius, executive dir., City Hall, takes bids in about 4 months, constructing low cost housing project. $1,800,000. Noted Apr. 4, CD—Apr. 7, ENR.

★**O., East Liverpool** — Bd. Educ. election Aug. 9, to vote $815,000 bonds, constructing $500,000 downtown high school, and $250,000 suburban junior high school. P.W.A. will be asked for $337,500. Noted Nov. 16, CD—Nov. 13, ENR.

★**Okla., Stillwater**—A. & M. College, c/o Dr. H. G. Bennett, pres., plans 3 story, brick, stone, steel library. $750,000. P.W.A. grant allotted.

★**T. H., Honolulu** — Kamehameha School plans by C. W. Dickey, Damon Bldg., Honolulu, six dormitory buildings, infirmary, administration building, classroom unit and dining hall. $750,000.

★**Man., Winnipeg**—Municipality [illegible] ment plant. $500,000.

BIDS ASKED

†**Calif., Los Angeles**—Aug. 12, by Veterans Administration, Arlington Bldg., Wash., D.C., constructing 2 buildings at Veterans Hospital.

†**Calif., Palo Alto**—Aug. 2, by Veterans Administration, Arlington Bldg., Wash., D.C., constructing infirmary building at Veterans Hospital.

Conn., Danbury—July 6, by A. T[illegible] Tweedy Silk Mills, 4 story, 46x152 [illegible] brick steel hospital unit, Locust St., for Danbury Hospital, A. W. Sperry, chn. Building Com. $300,000. L. Beach Scheide, 100 Pearl St., Hartford, archt. Noted June 7, CD—June [illegible] ENR.

★**Conn., Meriden**—July 12, by State R. A. Hurley, comr. P. Wks., Hartford, general contract infirmary, administration and school unit. $520,000. P.W.A. pr[illegible] F. J. Dixon, State Office Bldg., Hartford, archt. Noted Feb. 24, CD—Mar. 3, ENR under "Contracts Awarded."

Conn., Norwich—July 6, by State R. A. Hurley, comr. P. Wks., State Office Bldg., Hartford, general contract 2 story brick steel infirmary for Norwich State Hospital. $121,000; plumbing $11,000; heating and ventilating $13,000; electrical work $8,000. Total est. $153,000. F. J. Dixon, State Office Bldg., Hartford, archt. Noted May 18, CD—Apr. 28, ENR.

Conn., Shelton—July 12, by State R. A. Hurley, comr. P. Wks., State Office Bldg., Hartford, brick, steel, granite, limestone infirmary, incl. central heating plant and facilities for 140 patients, 3 elevators. [illegible] F. J. Dixon, State Office Bldg., Hartford, archt. Noted Jan. 28, CD—Feb. 3, ENR.

†**Ill., North Chicago**—Aug. 2, by Veterans Administration, Arlington Bldg., Wash., D.C., constructing building at Veterans Hospital.

†**Ind., Indianapolis**—July 26, by Veterans Administration, Arlington Bldg., Wash., D.C., constructing building at Veterans Hospital.

†**Ia., Corning**—July 26, by Treas. Dpt. at office Sup. Archt., Wash., D.C., constructing U. S. Post Office. $75,000. Noted Apr. 20, CD.

†**Ia., Knoxville**—July 22, by Veterans Administration, Arlington Bldg., Wash., D.C., constructing Building, incl. plumbing, heating and electrical work Buildings 82 and 85, Veterans Hospital.

†**Kan., Wichita**—Aug. 9, by Veterans Administration, Arlington Bldg., Wash., D.C., constructing additional buildings at Veterans Hospital.

†**Me., Bath**—Aug. 9, by Veterans Administration, Arlington Bldg., Wash., D.C., main dormitory barracks building, at Veterans Hospital.

†**Mass., Bedford**—July 22, by Veterans Administration, Arlington Bldg., Wash., D.C., constructing building, incl. plumbing, heating and electrical work, Buildings 61 and 62, at Veterans Hospital.

Mass., Brookline—July 12, by Town School Com., E. R. Calverly, supt. of Schools, Town Hall, 3 story, basement, 89x120 ft., brick stone addition to Mary C. Baker School, concrete found., incl. heating, plumbing, electrical work, ventilation and sprinklers, Beverly Rd. $161,500. Kilham, Hopkins & Greeley, 126 Newbury St., Boston, archts. Noted Mar. 30, CD.

†**Mich., Camp Custer**—July 26, by Veterans Administration, Arlington Bldg., Wash., D.C., constructing building and 1 infirmary building, Veterans Hospital.

Mich., Northville—July 7, by Bd. Auditors, Wayne Co., J. C. Cowan, chn., Wayne Co. Bldg., Detroit, constructing and erecting 1 multi-cylinder vertical unaflow engine of heavy duty poppet valve type and direct connected to 300 kw. alternate current generator and V-belt driven exciter at Wayne County Training School. N. O. Gould, [illegible] Boyer Bldg., Detroit, engr.

†**Neb., Lincoln**—Aug. 9, by Veterans' Administration, Arlington Bldg., Wash., D. C., constructing additional building at Veterans' Hospital. Noted Feb. 1, CD—Feb. 3, ENR.

†**N. J., Lyons**—July 22, by Veterans' Administration, Arlington Bldg., Wash., D. C., constructing building, incl. plumbing, heating, electrical work and elevator, Building [illegible] Veterans' Hospital.

N. J., Sayreville—July 5, by Bd. Educ., addition to Wilson School, on Dane St. $194,000. P.W.A. grant $86,727, Boro to pay remainder. A. Merchant & Son, 1 Elm Row, New Brunswick, archt. Noted May 31, CD—June 2, ENR.

†**N. Y., Bath**—Aug. 9, by Veterans Administration, Arlington Bldg., Wash., D.C., constructing new barracks at Veterans Hospital.

†**N. Y., Fort Niagara**—July 21, by Con. Q.M., Fort Niagara, restoration and completion Barracks Building 50S, Cir. [illegible] Noted Apr. 5, CD—Apr. 7, ENR.

N. Y., Long Island City—July 5, by New York City Housing Authority, 10 East 40th St., New York, demolition of structures and buildings on site of Queensbridge Housing Project, lying within area bounded on north by 41st Ave., on east by 21st St., on south by Bridge Plaza North, and on west by State Canal Terminal and East River, Queens Boro. Noted June 15, CD—June 2[illegible] ENR.

Public Buildings (Continued)

†O., Chillicothe—Aug. 4, by Veterans' Administration, Arlington Bldg., Wash., D. C., constructing building at Veterans' Hospital.

Pa., Mercer—July 26, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $75,000.

Pa., Mount Gretna—Aug. 26 by General State Authority, A. S. Janeway, executive dir., 600 North 2nd St., Harrisburg, brick, steel, stone, concrete Maximum Security Prison, Part 2. C. J. Lappley & H. Hornbostel, Riverview Manor, Harrisburg, archts. Noted May 10, CD—May 12, ENR.

†Pa., Pittsburgh—Aug. 9, by Veterans' Administration, Arlington Bldg., Wash., D. C., constructing foundations for additional buildings at Veterans' Hospital.

Pa., State College—July 8, by General State Authority, A. S. Janeway, executive dir., 600 North 2nd St., Harrisburg, alterations and additions to power plant equipment, Contr. 40, for state college, incl. demolition and removal of present structural steel foundation supporting the existing 750 kw. turbine-generator; renovating existing 1,250 kw. turbine-generator and installing surface type condenser therefor, complete with pumps, piping and appurtenances; drilling two 12 in. deep wells, supplying turbine type deep well pumps and piping for circulating water to condenser, drain lines from condenser to storm sewer, safety valve piping and miscellaneous piping changes incidental to turbine generators; new foundations for 2,500 kw. turbine generator, electrical wiring and switchboard changes. $40,000. Hunter & Caldwell, 3601 Fifth Ave., Altoona, archts. C. Z. Klauder, 1429 Walnut St., Phila., and Altoona, assoc. archt.

★**Pa., White Hill**—Aug. 19, by General State Authority, A. S. Janeway, executive dir., 600 North 2nd St., Harrisburg, brick, steel, concrete State Industrial School for Boys, Part 2. $2,142,062. C. J. Lappley & H. Hornbostel, Riverview Manor, Harrisburg, archts. Noted May 10, CD—May 12, ENR.

†Pa., Wilkes-Barre—July 15, by Treas. Dpt., Procurement Div., Wash., D.C., constructing U. S. Post Office, Wyoming Ave. and Pierce St., Kingston, Wilkes-Barre. L. A. Simon, Treas. Dpt., Wash., D. C., archt.

Tenn., Chattanooga—July 12, by W. Cummings, judge Hamilton Co., constructing Falling Water Grammar School, and altering and building additions to Mountain Creek Grammar School and Birchwood High School, Sub. Project 4, 5 and 6, Docket Tenn. 1028-1-DC. R. H. Hunt Co., Chattanooga Bank Bldg., archts.

†Tenn., Lenoir City—July 20, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office; adv. ENR June 30.

†Tenn., Murfreesboro—Aug. 8, by Veterans' Administration, Arlington Bldg., Wash., D. C., constructing 2 buildings at Veterans' Hospital.

†Tex., Center—July 13, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing semi-fireprof U. S. Post Office building. $67,000. Noted July 23, CD—July 29, ENR.

Tex., Liberty—July 8, by City, c/o L. C. Steusoff, secy., constructing power plant, electric lighting and power system and distribution system. $115,000. Bids May 31 rejected. Jarrett Eng. Co., 308 Hughes St., Houston, engrs. Noted May 17, CD—May 19, ENR.

†Tex., Waco—July 19, by Veterans' Administration, Wash., D. C., constructing building, incl. plumbing, heating and electrical work, Building 7, at Veterans' Hospital.

†Va., Langley Field—July 26, by Con. Q.M., constructing children's school at Langley Field; adv. ENR June 30.

Va., South Boston—July 6, by School Bd., F. L. McKinney, clk., plumbing, heating and electrical contracts for C. H. Friend High School. Hinnant & Smith, Lynchburg, archts. and engrs.

†W. Va., Huntington—Aug. 2, by Veterans' Administration, Arlington Bldg., Wash., D. C., constructing building at Veterans' Hospital.

†Wis., Columbus—July 26, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $75,000. Noted Apr. 20, CD.

Wis., Madison—July 7, by State Hy. Comn., Madison, 2 story, basement, 65x148 ft., brick highway laboratory, plain found. $175,000. E. L. Roettiger, Madison, state hy. engr. Noted Mar. 10, CD—Mar. 17, ENR.

†Haiti, Port au Prince—Aug. 3, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing legation office buildings.

★**Ont., Ottawa**—July 25, by Secretary Dpt. P. Wks., Ottawa, constructing 7 story, basement, 104x128 ft., brick, steel Post Office, plain found., Sparks St. $750,000. W. E. Noffke, 46 Elgin St., archt. Noted Mar. 24, CD—Mar. 31, ENR.

Que., Hull—July 4, by J. S. Lefort, archt., 160 Wellington St., constructing 2 and 3 story, 135x225 ft. steel, stone, concrete jail, Aylmer Rd. at Val Tetreau, suburb of Hull, for Quebec Provincial Government, Quebec City. $200,000. Noted Aug. 11, CD—Aug. 19, ENR.

LOW BIDDERS

★**†O., Dayton** — Veterans Administration, Arlington Bldg., Wash., D. C., June 21, constructing additional buildings at Veterans Administration Facility, from N. P. Severin, 222 West Adams St., Chicago, Ill., $824,000

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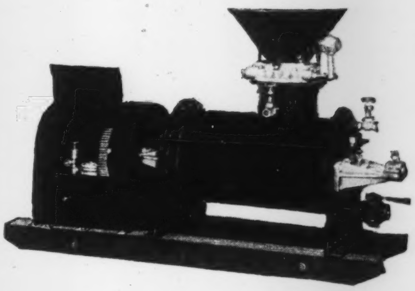

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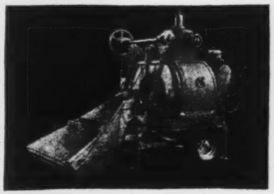

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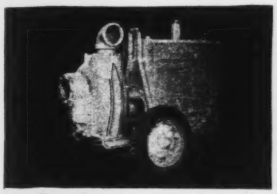

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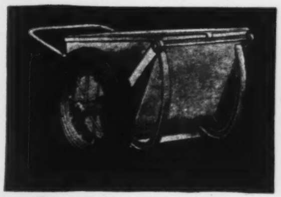

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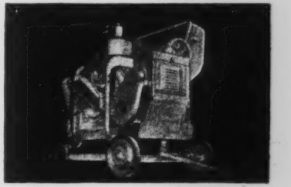

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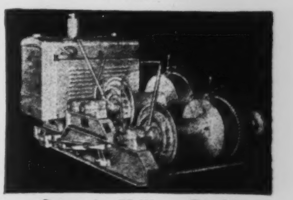

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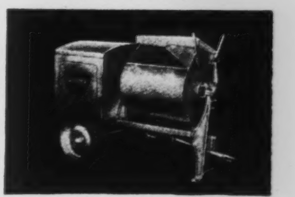

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Public Buildings (Continued)

elevators, from Montgomery Elevator Co., 30-20th St., Moline, Ill., $36,372refrigeration, from Avery Eng. Co., 2341 Carnegie Ave., Cleveland, $34,776. Noted May 4, CD.

CONTRACTS AWARDED

Calif., Coalinga—H. V. Dodd, clk. Coalinga Union High School Dist., general contract Junior High School unit and administration building, to Midstate Constr. Co., Pacific S. W. Bldg., Fresno, **$118,873*****plumbing and heating, to Barrett-Hicks Co., 1027 Broadway, Fresno, **$14,430*****electrical work, to American Electric Co., 462 Bryant St., San Francisco, **$8,615.** Grand total $141,918. Bids June 15. Noted May 31, CD—June 2, ENR.

Calif., East Bakersfield — Kern County Union High School Dist., constructing additional buildings at East Bakersfield branch of high school, incl. 10 classrooms, auditorium, boys' gymnasium and girls' gymnasium, rein.-con. steel, timber construction, steam heating, to L. H. Hansen & Sons, Drawer N, Station A, Bakersfield, **$349,290.** Est. $325,000. Bids June 20, awarded June 20. Noted June 2, CD—June 9, ENR.

†Calif., Healdsburg—Farm Security Administration, 418 Wells Fargo Bldg., San Francisco, constructing complete community buildings and facilities at Sonoma Unit California Migratory camps, to W. V. Bernard, 227 San Carlos Ave., El Cerrito, **$52,820.** Bids June 21. Noted June 10, CD—June 16, ENR.

Calif., Livermore—Alameda Co., installing and completing Arroyo-Del Valle Central heating plant at county sanitarium, near here, to Alta Electric & Mechanical Co., 467 O'Farrell St., San Francisco, **$58,725.** Noted Sept. 13, CD—Sept. 16, ENR.

Calif., Montebello — Montebello Unified School Dist., 15,000 sq. ft. floor space classroom building and 50x100 ft. shop building, each at Montebello Junior High School and Eastmont Junior High School, to W. T. Loesch, 119 East Union St., Pasadena, **$138,877.** Bids May 24. Noted May 12, CD.

†Calif., Riverside—Dpt. Agriculture, Wash., D. C., constructing 2 story, 28x100 ft. headhouse, two 32x100 ft. each greenhouses, 100x17x9 ft. machinery pit Rubidoux Heights, at U. S. Salinity Laboratory, Rubidoux Heights, to G. M. Easton, 5764 San Vicente Blvd., **$36,800.** K. M. Saunders, 3484 Jackson St., archt. Bids June 10, awarded June 17. Noted May 19, CD—May 26, ENR.

Conn., Hartford—State, R. A. Hurley, comr. P. Wks., State Office Bldg., Hartford, elevators, dumbwaiters, for brick, steel infirmary building, Cedarcrest Sanatorium, to General Elevator Co., 338 Ann St., **$19,816** ***heating and ventilating, to Libby & Beinn, Inc., 135 Sheldon St., est. **$40,000*****plumbing, to Ideal Plumbing & Heating Co., 208 Meadow St., New Haven, **$33,000.** Grand total $92,816. Noted Mar. 4, CD—Mar. 10, ENR, under "Contracts Awarded."

Conn., Hartford—State, R. A. Hurley, comr. P. Wks., repairing, renovating, painting State Building, incl. masonry, painting inside, pointing, cement walks, landscaping, etc., **W.P.A.** labor. **$135,595. Est.** $150,000. A. A. C. Krams, Dpt. P. Wks., State Office, archt. Noted Apr. 25, CD.

Conn., Hartford — City, Bd. Educ., 249 High St., fire hazard correction program at school, Market and Morgan Sts., to M. Juster, 165 Manchester St., **$21,365.** Total $27,560. Total est. of 11 schools $400,000. Bids June 21, awarded June 21. Noted June 7, CD—June 9, ENR.

Ill., Chicago—Bd. Educ., 228 North LaSalle St., general contract constructing Kershaw School, 6431 South Union Ave., to Olson, Carlson Co., 5141 Blackstone Ave.***steam heating, to Robert Gordon, 21 North Jefferson St.***heat regulation, to Johnson Service, Inc., 1355 West Washington St.***plumbing, to J. J. Calnan Co., 440 South Dearborn St.***ventilating, to Hunter Clark Co., 2800 Cottage Grove Ave.***wiring, to Divane Bros., 3826 West Van Buren St.***masonry and concrete for Hyde Park High School, 2nd addition, to W. R. Goss, Tribune Tower, Chicago***carpentry, to F. E. Young, 7553 Cregier Ave.***plumbing, to Dvorak & Gazin, 2735 Devon Ave.***heating, to S. J. Reynolds, 2223 Ogden Blvd.***structural steel and iron, to Duffin Iron Wks., 37 West Van Buren St.***heat regulation, to Minn.-Honeywell, 433 Erie St.***ventilating, to G. Mathis & Son, 5658 South Western Ave.***marble, to Standard Mosaic Co., 4551 5th Ave.***wiring, to Meade Electric Co., 3252 Franklin St. Noted Jan. 20, CD—Jan. 27, ENR.

Ill., Peru—City, c/o F. S. Klug, clk., altering municipal generating station, and turbogenerator foundation pit, to Trompeter Constr. Co., Peru, **$15,665.** Bids Mar. 25. Noted Mar. 10 CD—Mar. 17, ENR.

Ind., Indianapolis—Marion Co., remodeling and bilding 2 and 4 story irregular shaped, brick, rein.-con. addition to county infirmary, State Rd. 52, at Julietta, **W.P.A.** labor. **$350,000.** Bids July 8, on tempered hard board, Portland cement, reinforcing steel, bars, bar spacers, etc., f.o.b. Julietta, R.F.D. Indianapolis. Noted Feb. 17, CD—Feb. 24, ENR.

Ia., Muscatine—Muscatine Co., c/o Auditor, general contract constructing 1 story, 36x118 ft. brick, shops and garage, Isett Ave. and Lake Park Blvd., to Otto Wendling, Muscatine, plumbing, to A. C. Springborn, Muscatine. Bids June 22. Noted June 20, CD.

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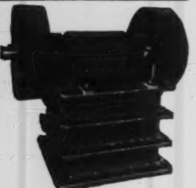

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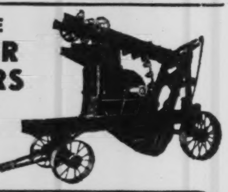

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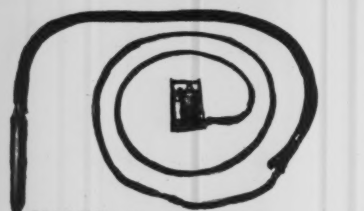

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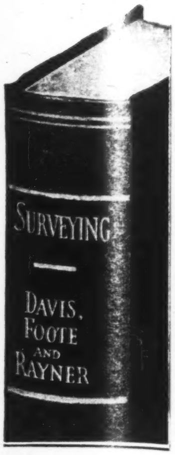

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Public Buildings (Continued)

La., **New Orleans** — Bd. Administration, constructing electrical work for auxiliary buildings Sects. 1 and 2, comprising auxiliary building, power and refrigeration plant and metal shops building, warehouse, and woodworking shops building and animal house for Charity Hospital, to Industrial Electric Co., Inc., 3227 Magazine St., **$76,544. P.W.A.** Bids June 7. Noted June 2, ENR.

†Md., **Annapolis**—Yards & Docks, Wash., D.C., constructing museum, Spec. 8592, to Ross Eng. Co., 20 L St. S.W., Wash., D.C., **$170,172**; improvements to electric system, Spec. 8722, to A. M. Diamond, 134 Boerum Pl., Brooklyn, N. Y. **$19,840.** Bids June 15. Noted May 20, CD—May 26, ENR.

Mich., **Ypsilanti**—Michigan State Normal College, constructing Rockham School, 2 story, basement, 100x300 ft., brick, steel, stone, concrete, plain found., Normal College Campus, to W. E. Wood Co., 4649 Humboldt Ave., Detroit. Est. **$250,000.** Awarded June 21. Noted Apr. 25, CD.

†Minn., **Fort Snelling** — Con. Q. M., constructing additions and alterations to hospital, to Northwestern Constr. Co., Inc., 1401 Third Ave. S., Minneapolis, **$29,588.** Bids June 6, awarded June 11. Noted May 19, CD—May 26, ENR.

Mo., **La Plata** — M. Young, mayor, City Hall, Sect. I, distribution system for power plant, to Snyder & Johnson, Inc., Humboldt, Ia., **$34,595.** Bids June 3. Noted May 24, CD—May 26, ENR.

†Mont., **Great Falls**—Treas. Dpt. at office Supt. Archt., Wash., D. C., constructing additional vault in U. S. Post Office, to F. B. Dudley, Great Falls. **$444.** Bids May 6. Noted Apr. 18, CD—Apr. 21, ENR.

N. J., **Marlboro**—Institutions & Agencies, Trenton, general contract constructing building for disturbed patients at Marlboro State Hospital, to Pellechia Constr. Co., 50 Branford Pl., Newark, **$99,994*****plumbing, to A. Arace & Son, 642 3rd Ave., Elizabeth, **$12,842*****heating, to G. J. Tobin, 187 North Ave., Plainfield, **$13,479*****electrical work, to F. Sulzer Co., Cranford, **$10,974*****steel, to Elizabeth Iron Wks., 61 1st St., Elizabeth, **$23,831*****underground steam lines, to H. W. Porter, 825 Frelinghuysen Ave., Newark, **$2,390.** Grand total $163,510. Bids June 1. Noted May 19, CD—May 26, ENR.

N. J., **Marlboro**—Institutions & Agencies, Trenton, general contract constructing two children's buildings, at Marlboro State Hospital, to A. A. LaFountain, Beech St., Hackensack, **$104,850*****water lines, to Ailey & Ferraro, 139 Centre St., Trenton, **$3,465*****heating, to J. A. Cooney, 210 North 4th St., Harrison, **$15,341*****steel, to B. Katchen, Jr., Irvington, **$17,611*****plumbing, to Elling Bros., Somerville, **$10,984*****electrical work, to J. L. Hann, Elizabethtown, **$11,407.** Grand total $163,650. Bids May 31. Noted May 25, CD.

N. J., **Marlboro**—Institutions & Agencies, Trenton, general contract constructing senile building for New Jersey State Hospital, to A. A. La Fountain, Beech St., Hackensack **$109,690*****plumbing and heating to W. Bittner, 2015 Hamilton Ave., Trenton **$9,852** and **$17,968** respectively***electrical work, to Bachman Electric Co., Perth Amboy **$7,858*****strutural steel, to Elizabeth Iron Wks., 61-1st St., Elizabeth, **$20,671.** Grand total **$166,039.** Bids June 13. Noted June 8, CD.

†N. Y., **Hudson**—Treas. Dpt. at office Sup. Archt., Wash., D.C., extension to U. S. Post Office, to Samuel Plato, 704 Bway., Kokomo, Ind. **$64,450.** Bids June 7. Noted May 10, CD—May 12, ENR.

N. Y., **Malone**—State Dpt. Educ., State Education Bldg., Albany, general contract School Building 12, at State School for Deaf, to Andover Associates, 110 East 42nd St., New York. Est. **$150,000.** Bids May 19. Noted May 3, CD—May 5, ENR.

†Okla., **Idabel**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to Busboom & Rauh, 153 South Santa Fe Ave., Salina, Kan., **$44,575.** Bids June 14. Noted June 8, CD.

Tex., **Fort Worth**—City, c/o D. L. Lewis, mgr., general contract 3 story, 40x50x150 ft., limestone, steel library, Throckmorton and 9th Sts., to A. Farnell Blair, Lake Charles, La., **$232,513*****plumbing, to Harry Fortune, 2210 West 7th St., Forth Worth **$9,750*****heating, ventilating, and air conditioning, to Young & Pratt, Lubbock, **$26,957*****electric wiring, to Empire Electric Co., 1015 West Rosedale St., **$12,230.** Subject to **P.W.A.** approval. Grand total $281,450. Noted Sept. 2, CD—Sept. 9, ENR.

†Va., **Alexandria**—Yards & Docks, Wash., D.C., painting Naval Torpedo Factory, Spec. 8717, to M. G. Moshites, 1010 Beech Ave., Pittsburgh, Pa., **$6,610.** Bids June 8.

N. S., **Halifax**—Dalhousie University Bd., constructing 2 story, basement, 50x85 ft. brick, steel medical science library building, plain found., College St., to Brookfield Constr. Co., 169 Hollis St. Est. **$150,000.** Awarded June 17. S. P. Dumaresq, 300 Royal Bank Bldg., archt. Noted June 23, CD.

Ont., **Toronto**—Dpt. P. Wks., Ottawa, Ont., new heating system at Christie St. Hospital, to R. G. Steen, Ltd., 12 Humewood Dr., $27,058. Bids June 17. Noted June 8, CD.

Que., **Lauzon**—Secretary Dpt. P. Wks., Ottawa, Ont., rewarded contract power house,

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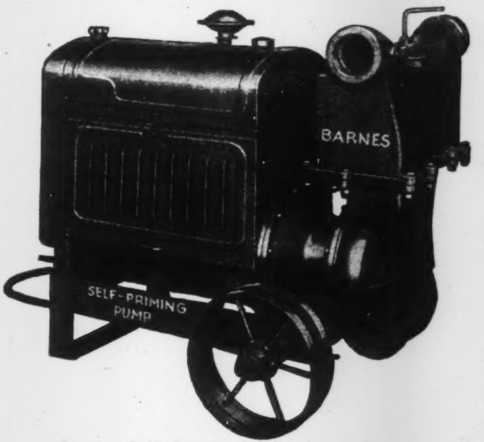

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Public Buildings (Continued)

pump house equipment at Lorne Dry Dock, to Belanger & Bertrand, L'Original, Ont., **$213,186.** Awarded June 16. Noted June 3, CD.

COMMERCIAL BUILDINGS

PROPOSED WORK

★**Ga. Augusta**—Southern Bell Telephone Co., c/o F. M. Craft, Eng. Dpt., Hurt Bldg., Atlanta, bids in January constructing two 2 story, exchange buildings, one on Kings Way, and other on Greene St. $1,400,000.

★**Mich., Royal Oak**—Radio League of Little Flower, c/o C. E. Coughlin, pastor, Twelve mi. Rd. and Woodward R.O., plans 2 high schools and grammar school on 22 acre site at Woodward Ave. and Thirteen Mile Rd., to be known as Academy of Little Flower. $500,000. Site purchased.

★**Minn., St. Paul**—St. Thomas College, J. H. Moynihan, pres., Cleveland and Summit Aves., plans science building, 21st St. and Summit Ave. $1,000,000. Financing under way by subscription. $250,000 subscribed to date.

★**O., Cleveland**—Park Plaza Corp., c/o W. S. Ferguson, archt., 3030 Euclid Ave., completing plans 9 story, basement, 66x139 ft., 69 suite, brick, steel apartment, East 107th St. and Parkland Ave. $600,000.

★**Pa., Phila.**—Anthony P. Miller, Inc., 3333 Arctic Ave., Atlantic City, N. J., soon lets contract thirty 1 story, 30x160 ft., brick, steel, concrete, limestone apartment buildings with wings, 140 garage building, etc., Ogontz St., Olney Ave. and 18th St., for Owner, c/o G. S. Idell, archt., 1510 Chestnut St. Est. $1,000,000. Noted May 23, CD—May 26, ENR.

★**Pa., Phila.**—Daughters of Most Holy Redeemer, c/o St. Joseph's Home for Aged, Meadowbrook, plans by E. A. Stopper, Liberty Trust Bldg., hospital building, containing sanatorium, convalescent home, nurses' home and training school, on property 2nd St., 65th Ave., Front St. and Laveer St. (35 acres). Total est. $3,000,000. First unit for hospial $1,000,000.

★**Ont., Toronto**—Toronto Northwest Hospital Assn., plans 300 bed hospital. $600,000. Financing under way.

★**Que., Montreal**—Owner, c/o Spence & Mathias, archts., 2063 Union Ave., making plans 12 story, basement, brick, steel mercantile building, plain found., Mayor St. $750,000.

BIDS ASKED

Calif., San Francisco—Directors San Francisco Bay Exposition, Inc., 585 Bush St., taking bids 1 story, 300x400 ft. wood frame, Western States Building, Treasure Island, World's Fair site, also 120x140 ft. surrounding court with 800 persons seating capacity auditorium, tile and composition roof.

Calif., San Francisco—July 15 (extended date), by State of California, Com. for Golden Gate International Exposition, 660 Market St., 2 story, wood frame exterior California State Exhibit building having 283 ft. frontage, 235 ft. depth, etc., Treasure Island, World's Fair site. Noted June 22, CD—Feb. 10, ENR.

CONTRACTS AWARDED

Calif., Mill Valley—Land Development Co., represented by E. Pohli, 8 Corte Madera Ave., constructing 45 one story, wood frame residences, day labor. Construction of 10 buildings started.

Calif., San Francisco — Church of Jesus Christ of Latter-Day Saints, 47 East South Temple St., Salt Lake City, Utah, 3 story, steel and wood frame church and Sunday school units, L-shaped, 22nd Ave. and Lawton St., to C. Lindsay, 802 Taraval St. $150,000.

Calif., Sonora—F. W. Quandt, archt., 401 Phelan Bldg., San Francisco, rein.-con. theatre, 1,000 persons seating capacity, to J. Johnson & Son, 1614 Church St., San Francisco, for Harvey Amusement Co., 291 Golden Gate Ave., San Francisco, on percentage basis. Noted June 17, CD—June 23, ENR.

Conn., Stamford—Rochor, Inc., 505 Fifth Ave., New York, H. E. Mitler, pres., 3 story apartment units, 170 apartments, 3 and 4 rooms each, brick, steel construction, Richmond Hill Ave. Owner builds under supervision of J. L. Gerrie, c/o owners. **$375,000.** Noted June 17, CD.

Ga., Atlanta—Alsa Candler, Inc., Candler Bldg., altering ground floor of Candler Building, to R. Didschuneit, Candler Bldg., constructing branch bank quarters, to Nonnemaker-Clayton Co., Red Rock Bldg. F. P. Smith, Norris Bldg., archt. for bank quarter construction. Hentz, Adler & Schutze, Candler Bldg., archts. for 1st floor alteration.

Ill., Evanston—Schmidt, Garden & Erickson, archts., 104 South Michigan Ave., Chicago, constructing orphans' home, 2039 Ridge Ave., for Cradle Society, 2039 Ridge Ave., to Sumner Sollitt, 307 North Michigan Ave. Bids May 3. Noted May 26, CD.

★**Ill., Springfield**—H. R. Helmle, First Natl. Bank Bldg., Springfield, constructing 12 story 126x160 ft. hospital 7th to 9th Sts., for St. Johns Hospital, Mason St. and 8th St., to J. L. Simmons, 101 North 5th St., Springfield, **$712,625,** est. $1,250,000. Bids June 20. Noted June 17, CD.

Kan., Wichita—Sears Roebuck & Co., West Arthington and South Homan Sts., Chicago, Ill., 2 and 3 story, basement, brick, concrete store and office building, Market and William Sts., to Hahner & Foreman, Broadview Hotel Bldg. Est. about **$250,000.** Overend & Boucher, Wichita, archts.

Mass., Cambridge—Lever Bros., A. Morrison, Planning Dpt., 164 Bway., constructing office building, facing Memorial Dr., to Stone & Webster Eng. Corp., 49 Federal St., Boston. Est. exceeds **$150,000.** D. DesGranges, 49 Federal St., Boston, archt. Shreve, Lamb & Harmon, 11 East 44th St., New York, consult. archts. Noted Feb. 24, CD.

Mass., Milton — McGuirk-Driscoll Co., 404 Adams St., Quincy, thirty-five 2 story, basement, timber residences, concrete founds., Center Lane, with 1 car garages, separate contracts. **$210,000.** Private plans. Work started.

Mass., Worcester — Frost, Chamberlain & Edwards, archts., 390 Main St., general contract 5 story, basement, 46x102 ft., brick, steel office building addition, Chestnut St., to J. W. Bishop Co., 109 Foster St., for Massachusetts Protective Association, Inc., 18 Chestnut St. Est. **$150,000.** Bids June 4. Noted May 20, CD—May 26, ENR.

N. J., Demarest—Demarest Development Co., East Hardenburgh Ave., constructing 2½ story, basement, 28x35 ft. homes development, consisting 34 homes at $7,000 each, East Hardenburgh Ave., separate contracts. **$238,000.** B. S. Newman, 173 Main St., Hackensack, archt.

★**N. J., Hasbrouck Heights**—Garden View Gardens, W. Snyder, 26 Schermerhorn St., Brooklyn, N. Y., 2½ story, basement 28x34 ft. homes development, consisting 100 homes at $5,000 each, Collins Ave., separate contracts. **$500,000.** P. H. Butler, Elm Ave. and Cedar Lane, Teaneck, archt.

★**N. J., Livingston**—McGovern Bros., 88 Carnegie St., East Orange, 2 story, basement homes development consisting 100 homes at $5,000 each, Westlawn Rd., separate contracts. **$500,000.** E. Schmidlin & E. McMurray, 982 Stuyvesant Ave., Union, archts. Noted Feb. 3, CD—Feb. 10, ENR.

N. J., Rahway—L. Reeb, Colonial St., 1½ story, basement homes development, consisting 50 brick, frame homes at $5,000 each, separate contracts. **$250,000.** A. B. Mills, 1758 Columbia Rd., Wash., D.C., archts.

N. J., Woodridge—Church of Our Blessed Lady of Assumption, 2 story, basement, 30x70 ft. convent, to Vroman & Mathieu, Wagaraw Blvd., Paterson***2½ story, basement 79x140

Commercial Buildings (Continued)

ft. school, to J. H. Steel & Son, Inc., 46 North 2nd St., Paterson***heating for both buildings, to Langfeld Heating & Ventilating Co., New York***plumbing, to F. Lawton, Paterson***electrical work, to P. Panos, Matwood. F. J. Ricker, 685 Hudson Ave., New York, archt. Bids June 10. Noted June 8, CD.

N. Y., **Brooklyn**—F. C. Trump, Clarendon Rd. and 43rd St., constructing seventy-seven 2 story dwellings, Clarendon Rd. and 43rd St. Owner builds. Est. **$385,000.** First unit started initial group of 30 have already started, containing 5 rooms and built-in garage.

N. Y., Flushing—New York World's Fair 1939, Inc., Flushing Meadow Park, general contract utility building, Grand Central Parkway and Rosevelt Ave., to Perlman & Wortman, Inc., 109 East 29th St., New York, **$61,475*****plumbing, to S. Saltzman, 1985 Webster Ave., New York, **$7,175*****electrical work, to Walter Knapp & Co., Inc., 207 East 43rd St., **$3,048*****heating and ventilating, to Soling Heating & Cooling Co., 219 East 40th St., New York, **$8,145.** Grand total $79,843. Noted Aug. 20, CD—Aug. 26, ENR.

★**N. Y., Flushing**—H. Bonuck, 104-01 Roosevelt Ave., Corona, constructing two hundred and fifty 1 and 2 story homes, to be known as Queensboro Homes, on property of Old Winston Farm, fronting on Kissena Blvd. from Horace Harding Blvd. to North Hempstead Turnpike. Owner builds. Est. **$1,500,000.** First unit of 28 already started. W. O. Staber, 41-15 Benhem St., Elmhurst, archt.

N. Y., Flushing — Italian Government, Dr. Orazio Pedrazzi, Rome, Italy, foundations for exhibit, World's Fair Site, Flushing Meadow Park, to Turiano Foundation Corp., 3416 Giles Pl., New York, **$37,000.** Noted Sept. 2, CD—Sept. 9, ENR.

N. Y., Flushing—General Electric Co., River Rd., Schenectady, three buildings at World's Fair Site, Flushing Meadow Park, one for displays of products, one for house of magic auditorium and one for demonstration of artificial lighting, to A. L. Hartridge Co., 120 Bway., New York. Est. exceeds **$350,000.** Awarded June 22. Voorhees, Gemelin & Walker, 103 Park Ave., New York, archts. Noted July 6, 1937, CD—July 8, 1937, ENR.

N. Y., Jamaica—B. F. Bonner, 168th St. and Grand Central Parkway, constructing twenty 2 story houses, 165th and 166th Sts., development known as Parkway Community Homes, 168th St. and Grand Central Parkway, plots 40 to 60 ft. frontage and from 100x300 ft. in depth. **$150,000.** Owner builds.

★**N. Y., Jamaica**—Hyman Rosen, Maspeth Ave. and Rust St., Maspeth, and E. Tilles, 160-16 Jamaica Ave., Jamaica, constructing four hundred 2 story dwellings on Belmont Park Estates, Nassau Co., opposite Belmont Park, 2½ mi. from here, having frontage of ¾ mi. on Hempstead Turnpike. **$2,000,000.** Owner builds. First unit of 24 houses now under construction. W. Sambur, 160-16 Jamaica Ave., archt.

N. Y., New York — Protestant Episcopal Church of Epiphany, c/o Wyeth & King, archts., 18 East 48th St., constructing new church, York Ave. and 74th St., to Hegeman-Harris Co., 220 East 42nd St.

Wis., Milwaukee—Brust & Brust, archts., 135 West Wells St., masonry, concrete, carpentry for superstructure for church South 45th St., to Salb Constr. Co., 2045 North 49th St., Milwaukee, for Carmelite Fathers, 1233 South 45th St. Noted June 3, CD—June 9, ENR.

Que., Montreal—Reverend Sister of the Sacred Heart of Jesus, Sault aux Recollect, 4 story, basement brick, stone addition to convent, plain found., Gouin Blvd., to Concrete Constr. Ltd., 1032 Decarie St., **$225,000.** D. J. Spence, 2063 Union Ave., archt.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Ala., Mobile—PLANT—American Cyanamid & Chemical Co., 30 Rockefeller Plaza, New York City, plans plant to manufacture sulphate of alumina, on Terminal R.R. of Alabama State Docks Comn. on Chickasaw property, a few miles from here. $250,000.

Calif., **El Centro**—POWER SUB-STATION—Imperial Irrigation Dist., El Centro, plans 1 story, rein.-con. sub-station, 3rd St. between Orange and Holt Sts. $85,000. M. J. Dowd, El Centro, engr.

Calif., **Long Beach**—SERVICE STATION—Goodyear Tire & Rubber Co. of California, plans by Schilling & Schilling, archts. and engrs., 151 Linden Ave., 1 story, 100x134 ft., steel, glass brick, rein.-con. service station, Anaheim St. and Linden Ave. $40,000.

Calif., **San Jose**—SHOP—Rosedin Motor Works, c/o Architect, plans by E. W. Kress, 1st Natl. Bank Bldg., 1 story, 50x60 ft., brick shop.

Ga., Atlanta—WAREHOUSE—Western Electric Mfg. Co., Inc., 195 Bway., New York City, c/o L. A. Davis, dist. mgr., Atlanta, plans 3 story, brick warehouse, Forrest Rd. W. H. Kattelle, 195 Bway., New York City, engr.

Ga., Savannah—ROOFING PLANT — Dixie Asphalt Co., Savannah, c/o R. M. Nelson, 5021-8th Ave., Brooklyn, N. Y., plans brick roofing plant. $250,000.

Kan., Kansas City—PACKING HOUSE—Meyer Kornblum Packing Co., 300 Central Ave., Kansas City, Kan., plans by C. Schloemann, 6329 San Bonita Ave., Clayton, Mo., 2 story, 40x120 ft., rein.-con., brick packing house addition, 300 Central Ave.

Minn., Winona—DEPOT and WAREHOUSE—Chicago, Burlington & Quincy R.R. Co., W. H. Penfield, ch. engr., Union Station, Chicago, Ill., soon takes bids 1 story, basement, 88x106 ft., concrete, steel, brick depot and warehouse, 2nd and Lafayette Sts. $45,000. Private plans.

Mo., Kansas City — PRODUCE — Western States Grocery Co., 2029 Wyandotte St., final plans in progress by C. E. Keyser, 609 Minnesota Ave., 1 story, 170x20 ft., brick, steel produce building, rein.-con. found.

Mo., Sikeston—BOTTLING PLANT—Sikeston Cooca-Cola Bottling Co., Inc., indefinitely postponed construction 2 story, 70x100 ft. brick bottling plant, Center St. Noted Apr. 29, CD—May 5, ENR.

N. J., Madison—FACTORY—Farbo Co., 100 Kings Rd., plans by P. H. Butler, 326 Elm Ave., Teaneck, 2 story, brick flavoring extracts factory, Kings Rd.

N. Y., New York—GARAGE—Antur Holding Corp., E. K. Marks, pres., 111 Duane St., plans by W. J. Cherry, 16 East 50th St., 2 story, 127x179 ft. garage, west side of Sheridan Ave., 153 ft. north of 156th St. Est. $55,000. Bd. Standards & Appeals will have to rule on zoning question before contract is awarded.

N. Y., Tonawanda—PLANT—Curtiss-Wright Corp., Curtiss Aeroplane Div., soon takes bids plumbing, heating and electrical work for plant addition, Vulcan St. $50,000. Albert Kahn, Inc., New Center Bldg., Detroit, Mich., archts. Noted June 2, CD—June 9, ENR, under "Contracts Awarded."

N. C., Aulander—SERVICE GARAGE—C. H. Jenkins & Co. plans rebuilding auto service garage, recently destroyed by fire. To exceed $40,000. Damage exceeded $75,000.

★**Ore., Cascade Locks**—FACTORY—Pennsylvania Salt Mfg. Co., Widener Bldg., Phila., Pa., plans sodium chloride plant for manufacturing weed killer, on 120 acre site, Haskins property. $1,500,000. Site purchased.

Tex., McAllen—DISTILLERY—Dr. C. K. Lukis & Associates, plan 1 and 2 story distillery plant for production of cologne, antiseptics, perfumeries, blends for liquors and wines, etc. $60,000.

Tex., San Antonio — REFRIGERATOR PLANT — Ed. Friedrich Sales Corp., East Commerce St., plans 4 story, 48x70 ft., brick, rein.-con. refrigerator plant unit, concrete pile found. $58,000. Private plans. Owner may build with own forces.

Wash., Neilton—MILL—A. C. Murray & others, 202 East 5th St., Aberdeen, plans plant to reduce manganese ore and other minerals. $200,000. Electric furnace planned. RFC loan sought.

Wash., Tacoma—FACTORY—Tacoma Sash & Door Co., South 15th and Dock Sts., considering rebuilding plant recently destroyed by fire. $100,000. H. E. Emmons, company official.

Wash., Tacoma—WAREHOUSE—G. Scofield Co., South 15th and Dock Sts., considering rebuilding warehouse, recently destroyed by fire. $75,000.

Alta., Medicine Hat—REFINERY—Pembina Oils, Ltd., making plans oil refinery. $50,000. Engineer, c/o owner.

Man., Brandon — PLANT — Manitoba Cooperative Honey Producers, Ltd., J. W. Braithwaite, genl. mgr., plans to build and equip processing and packing plant. $40,000. Architect not appointed.

N. B., River Charlo—MILL—New Brunswick International Paper Co., Ltd., making plans rebuilding saw mill. $40,000. Private plans.

Ont., Chatham—FACTORY—Clem Sterilzer Ltd., c/o D. G. Kerr, K. C. Chatham, plans factory. $40,000.

Ont., Marmora—MILL—J. Conkwright & Sons plan saw mill and allied plant construction. **Maturity 1938.**

Ont., Rockton—PLANT—Beverley Holding Corp., Ltd., making plans brick addition to plant, plain found. Private plans.

★**Ont., Toronto**—MILL—Preston East Dome Mines, Ltd., 100 Adelaide St. W., plans 500 ton mill and development of property. $600,000. Financing obtained.

Que., Cap de la Madeleine—FACTORY—British Canadian Tobacco Co., Ltd., c/o L. Methot, 105 Blvd. Des Forges, Three Rivers, plans factory for manufacture of aluminum foil cigarette wrapping, etc., St. Laurence St. $75,000. Site purchased.

Que., Outremont—PLANT—Le Courrier du Cinema, Ltd., A. Janin, genl. mgr., plans printing, publishing and lithographing plant. $40,000. **Maturity 1938.** Architect not selected.

Que., St. Francois—MILLS—J. Tremblay making plans reconstructing flour and grist mill and saw mill, also new machinery. $40,000. Private plans.

Que., Sherbrooke—GRAIN BINS—Nadeau, Ltd., 7 Belvedere St. S., plans by A. Royer, 49 King St. W., for 9 concrete grain bins. $45,000.

Sask., Humboldt — FACTORY — Quick Results, Ltd., A. Wilkin, mgr., making plans factory for manufacturing furnaces, boilers, burners, etc. $50,000. Architect c/o owner.

Sask., Regina — POWER HOUSE — General Motors of Canada Ltd., J. B. Highfield, plant mgr., Oshawa, Ont., making plans remodeling power house involving switch from crude oil to coal. $65,000. Private plans.

BIDS ASKED

Calif., Campbell—WAREHOUSE—Binder & Curtis, archts., 25 West San Carlos St., San Jose, taking bids part 2 and 3 story, wood frame warehouse, for Prune and Apricot Growers Assn., San Jose. Est. $40,000 with equipment.

LOW BIDDERS

★**Mont., Shelby** — OIL REFINERY — Producers Refinery Co., Kansas City, Mo., constructing oil refinery, 3,000 bbl. capacity, from Arthur G. McKee Co., 2422 Euclid Ave., Cleveland, O.; Bechtel-McCone Parsons Co., Los Angeles, Calif.; and Frick-Reid Supply Corp., 108 North Trenton St., Tulsa, Okla. Est. $600,000.

CONTRACTS AWARDED

Calif., Oakland and San Francisco—SUB-STATIONS—Pacific Gas & Electric Co., 245 Market St., San Francisco, constructing 3 rein.-con. Bay Bridge Sub-Stations, to H. H. Larsen Co., 64 South Park St., San Francisco; constructing Island Sub-Station, to Dinwiddie Construc. Co., 210 Crocker Bldg., San Francisco. Noted June 13, CD—June 16, ENR.

Calif., San Francisco—WAREHOUSE—Volker Co., 631 Howard St., altering and constructing rein.-con. warehouse and additions, 2nd St., to Cahill Bros., 206 Sansome St., **$40,000.**

Calif., Upland — PACKING PLANT — Old Baldy Citrus Assn., 430 East 19th St., D. R. Foss, mgr., 60x160 ft., rein.-con. packing plant, 430 East 19th St. Est. **$50,000.** Owner builds under supervision of W. C. Jones, 731-2nd Ave. Noted May 4, CD.

Ga., Columbia—PLANT—Swift & Co., 244 Peters St. S.W., altering and constructing additions to 3 buildings, 1, 2 and 3 story, brick, steel, to A. K. Adams Co., 542 Plum St. N.W., Atlanta. Robert & Co., Bona & Allen Bldg., Atlanta, archts.

Ga., Rome—PLANT—Fox Mfg. Co., 1 story, 45x290 ft. brick, steel plant addition, to A. K. Adams Co., 542 Plum St. N.W., Atlanta. Bids June 7, awarded June 13. Noted June 2, CD.

Ill., Chicago—FACTORY—Chicago Molded Products Co., 2145 West Walnut St., construcing 2 story, 300x300 ft. factory, Kolma Ave., Augusta and Thomas Sts., to Enjay Constr. Co., 160 North LaSalle St. Est. **$150,000.** Noted Mar. 10, CD.

Ia., Waterloo—HOG STORAGE—Rath Packing Co., Waterloo, constructing 4 story, 52x242 ft., hog storage building, steel, concrete, to W. A. Klinger, Inc., 201 Warnock Bldg., Sioux City, **$100,000.** Noted June 9, CD.

Kan., Wichita—GRAIN ELEVATOR—Wallingford Public Terminal Elevator, constructing 360,000 bu. capacity addition to grain elevator to Chalmer & Borton, 28 East 1st St., Hutchinson.

Me., Portland—SUPER-SERVICE STATION—Jenney Mfg. Co., 12 India St., Boston, Mass., 1 story, brick super-service station, concrete found., Middle and India Sts., to Benedetto Bucci Contr. Co. Inc., 117 Newbury St. Bids June 6, awarded June 16. Noted June 2, CD.

Mass., Springfield—FACTORY—Van Norman Machine Tool Co., 160 Wilbraham Ave., steel superstructure 1 story, 52x140 ft., factory, Wilbraham Ave., to Truscon Steel Co., 38 Chauncy St., Boston; foundation, to Fred T. Ley Co. Inc., 1215 Main St. Total est. exceeds **$40,000** with equipment. Work started.

N. Y., Cortland — FACTORY — Brockway Motor Co., Central Ave., 1 story, 100x250 ft. factory, to Marshall & Haley, Cortland. Est. exceeds **$40,000.** Private plans. Noted June 22, CD.

N. Y., New York—GARAGE—New York City Omnibus Corp., 123 West 146th St., 1 story, 199x648 ft. garage, 721-39 Lenox Ave., 101-65 West 146th St. and 100-160 West 147th St., separate contracts under supervision of F. Seaman, archt., 140 Cedar St. Noted May 26, CD—June 2, ENR.

O., Cleveland — LAUNDRY — Pioneer Linen Supply Co., M. Mascka, Jr., N.B.C. Bldg., 1 and 2 story, 90x103 ft. and 28x32 ft., brick, steel, laundry building, to Austin Co., 16112 Euclid Ave. Est. **$50,000.** Private plans.

Ont., Dundas—FOUNDRY and MACHINE SHOP—J. R. Ferguson, Galt, 60x75 ft. machine shop and 45x50 ft. foundry, Main St. Owner builds. Work started. Will install equipment for manufacturing cast iron electric lighting fixtures and appliances.

Ont., Kirkland Lake—ROASTER and FLOTATION UNIT—Lake Shore Gold Mines Ltd., constructing roaster and flotation unit for mill tailings, day labor. **$200,000.** Private plans. Noted Oct. 6, CD—Oct. 14, ENR.

SEARCHLIGHT SECTION

EMPLOYMENT : BUSINESS : OPPORTUNITIES : EQUIPMENT—USED or RESALE

OFFICIAL PROPOSALS

RATE:
40 cents a line or fraction

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5 P.M. Tuesday for new issue

Official notices of bids wanted on construction and related work, equipment and material for government, state, municipal departments and private enterprises.

Bids: July 1 (244)

Reconstruction of Bridges

NEW YORK, NEW YORK

NOTICE TO CONTRACTORS:—STATE OF NEW YORK—TRANSIT COMMISSION (Metropolitan Division—Department of Public Service)—270 Madison Avenue, New York, N. Y. FOR THE RECONSTRUCTION OF THE BRIDGES: (1) CARRYING EAST 175TH STREET OVER THE TRACKS OF THE NEW YORK AND HARLEM RAILROAD COMPANY (leased and operated by THE NEW YORK CENTRAL RAILROAD COMPANY, HARLEM-ELECTRIC DIVISION), and (2) CARRYING EAST 188TH STREET OVER THE TRACKS OF THE NEW YORK AND HARLEM RAILROAD COMPANY (leased and operated by THE NEW YORK CENTRAL RAILROAD COMPANY, HARLEM-ELECTRIC DIVISION), AND RELATED STRUCTURES, IN THE BOROUGH OF THE BRONX, NEW YORK CITY, N. Y. Pursuant to the provisions of Chapter 481, Laws of 1910, Chapter 936, Laws of 1935, and amendments thereto, and under the rules and regulations for projects financed in whole or in part with regular Federal Aid, Grade Crossing or Secondary Highway Funds, appropriated by Section 8 of the Act of June 16, 1936, (Pub. No. 686—74th Congress), sealed proposals for the reconstruction of the above projects will be received by the Transit Commission at the office of the Commission, 10th Floor, 270 Madison Avenue, New York, New York, until Two o'clock P.M. (D.S.T.) July 1, 1938, at which time and place they will be publicly opened and read. Maps, plans, specifications and proposal forms may be obtained at the office of the Transit Commission, 270 Madison Avenue, New York, New York, upon payment of Ten Dollars ($10.00) for the plans and proposal forms. Standard specifications are Two Dollars ($2.00) per copy. No refund will be made on plans, proposal forms or specifications. Plans and proposal forms may also be seen at the office of the State Department of Public Works, State Office Building, Albany, New York.

The proposal must be submitted in a separate sealed envelope with the name of the project plainly indicated on the outside of the envelope. Each proposal must be accompanied by cash, draft, or certified check, payable to the order of the Transit Commission, State of New York, for a sum not less than five (5) per centum and not more than six (6) per centum of the gross sum bid. Such deposit must not be enclosed in the envelope containing the proposal. The retention and disposal of such cash, draft or check by the Transit Commission shall conform with the procedure specified in subdivision 2 of Section 38 of the Highway Law. The amount of the certified check accompanying the proposal of the bidder to whom the contract is awarded will be returned when 10% of the work under the contract has been completed.

Federal Special Provisions require that the minimum wages to be paid on this project shall be as follows, unless shown otherwise in the itemized proposal.

Skilled Labor, ninety five cents per hour; Intermediate Grade Labor, eighty seven and one half cents per hour; Unskilled Labor, eighty seven and one half cents per hour.

In conformity with the provisions of Articles 8 and 8A of the State Labor Law, the minimum hourly rate of wages has been established and is annexed to and forms a part of the Special Specifications for the project and may be ascertained by reference thereto.

The right is reserved to reject any or all bids.

TRANSIT COMMISSION
—STATE OF NEW YORK
WILLIAM G. FULLEN, CHAIRMAN
REUBEN L. HASKELL, COMMISSIONER
M. MALDWIN FERTIG, COMMISSIONER
MACK NOMBURG, Secetary

(283)

Delaware Aqueduct

WESTCHESTER COUNTY, NEW YORK

It is expected that Contract 306, for the construction of the southerly portion of the West Branch-Kensico tunnel, the Kensico By-pass tunnel and the northerly portion of the Kensico-Hill View tunnel of the Delaware aqueduct and appurtenant structures will be advertised by the Board of Water Supply about July 8, 1938. The work is located in the Towns of North Castle, Mount Pleasant and Greenburgh, Westchester county, New York, and will comprise the completion of about 270 feet of shaft, the construction of approximately 18,850 feet of 15-foot diameter tunnel and 16,030 feet of 19.5-foot diameter tunnel, the construction of an influent and effluent chamber and a coagulating plant with their superstructures and the construction of a filter connection chamber, an aerator and minor structures.

Prospective bidders may obtain preliminary information, including a full set of contract drawings, purchasable at a cost of twenty-five dollars ($25.00) and not returnable, at the office of the Chief Engineer of the Board of Water Supply, eleventh floor, 346 Broadway, New York City. Pamphlets containing information for bidders, forms of bid and contract, specifications, contract drawings, etc., may be obtained at the office of the Board of Water Supply when the contract is advertised.

GEORGE J. GILLESPIE, President, HENRY HESTERBERG, RUFUS E. McGAHEN, Commissioners, Board of Water Supply; RICHARD H. BURKE, JR., Secretary.

U. S. Government

Procurement Division, Public Buildings Branch, Washington, D. C., June 14, 1938. —Sealed proposals in duplicate will be publicly opened in this office at 1 P.M., July 20, 1938, for *construction of the U. S. P. O.* at Livingston, Texas. Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Assistant Director, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Buildings Branch. (246)

WAR DEPARTMENT: United States Engineer Office, Galveston, Texas. Sealed bids will be received until 2:00 P.M., July 8, 1938, and then publicly opened for furnishing all labor and materials and performing all work for *dredging* the Louisiana-Texas Intracoastal Waterway (Sabine River-Corpus Christi Section) from a point in Matagorda Bay near Port O'Connor, Texas, to a point in San Antonio Bay about 7 miles south of Seadrift, Texas, a total distance of about 20 miles. The approximate amount of material to be removed including allowable overdepth is 5,700,000 cubic yards. Further information on application. (233)

TENNESSEE VALLEY AUTHORITY, KNOXVILLE, TENNESSEE. Sealed bids, in duplicate, will be received until 10 A. M., Central Standard Time, July 12, 1938, and then publicly opened, for *furnishing, fabricating, galvanizing and delivering Double Circuit Steel Transmission Towers and Accessories* for the Chickamauga-Guntersville 154 KV Transmission Line. The approximate weight of Galvanized Structural Steel involved in this contract is 116 tons. Bidding documents, for which there is no charge, available June 24, 1938, at above office. C. H. Garity, Director of Purchases. (279)

PROCUREMENT DIVISION, Public Buildings Branch, Washington, D. C., June 23, 1938.—Sealed proposals in duplicate will be publicly opened in this office at 1 P. M., Aug. 5, 1938, for *construction* at Richmond, Calif. Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $10 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S., Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Assistant Director, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Buildings Branch. (281)

WAR DEPARTMENT, Office of the Constructing Quartermaster, Sacramento Air Depot, Calif. Sealed proposals will be received at this office until 2:30 o'clock P. M., Pacific Standard Time, July 20, 1938, and then opened, for the *construction and completion of Asphaltic Concrete Wearing Surface for Runways at the Sacramento Air Depot*, Sacramento, California. Plans and specifications may be obtained at the above office upon deposit of $10.00. Certified check made payable to the Treasurer of the United States required as deposit. (280)

U. S. ENGR. OFFICE, Prov. R. I. Sealed bids, in duplicate, will be received until 2 p.m., d.s.t., July 19, 1938 for maintenance *dredging* approximately 377,000 cubic yards of material from New Haven Harbor, Conn. Information on application. (282)

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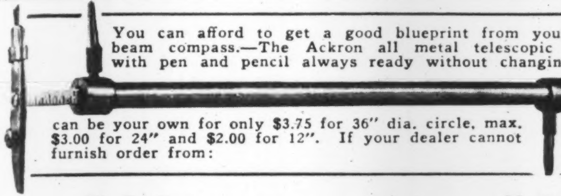

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U. S. Government

PROCUREMENT DIVISION, Public Buildings Branch, Washington, D. C., June 20, 1938.—Sealed proposals in duplicate will be publicly opened in this office at 1 P. M., July 20, 1938, for *construction of the U. S. P. O. at Lenoir City, Tenn.* Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the government, will be furnished, in the discretion of the Assistant Director, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Buildings Branch. (268)

UNITED STATES ENGINEER OFFICE, NEW YORK DISTRICT, NEW YORK, N. Y., Room 512, 39 Whitehall Street, New York, N. Y. SEALED BIDS will be received until 12:00 noon (Daylight Saving Time), July 26, 1938, and then publicly opened, for furnishing all labor and materials and performing all work for *dredging* approximately 57,970 cubic yards of material other than ledge rock and approximately 404 cubic yards of ledge rock in Rondout Harbor, N. Y., included within the area extending from approximately 0.62 mile above the mouth of the creek to the west end of Island Dock, a distance of about 1.25 miles. (271)

U. S. ENGINEER OFFICE, 1068 Navy Building, Washington, D. C. Sealed proposals will be received here until 3 P. M., July 22, 1938, and then opened, for furnishing labor and materials and performing work *for removal of 722 cubic yards of rock* or, alternately, 1442 cubic yards, place measurement, from Washington Harbor, Washington, D. C. (272)

U. S. Government

U. S. DEPARTMENT OF AGRICULTURE, Bureau of Public Roads, Washington, D. C., June 20, 1938. SEALED BIDS will be received at the office of the Bureau of Public Roads, 1725 F Street, N. W., Washington, D. C., until 11 o'clock a. m., E. S. T., July 12, 1938, for the construction of Project 3AB2, Shenandoah National Park, consisting of the *construction of a road mix bituminous surface course*, length 17.391 miles, in Rockingham, Greene and Albemarle Counties, Virginia. The approximate quantities of the more important items are as follows: 75,000 gal. refined tar for prime coat; 11,300 tons crushed stone for road mix; 200,000 gal. refined tar or cut-back asphalt for road mix and seal; and 3,000 cu. yds. spreading cover chips. Minimum rates of wages which must be paid laborers and mechanics on this project have been fixed by the Secretary of Labor as required by law. Where plans and specifications are requested, a deposit of $5.00, certified check or cash, will be required to insure their return within 15 days after opening of bids. Checks must be made payable to the Treasurer of the United States. Plans, specifications and bid forms may be obtained at the office of the Bureau of Public Roads, 1725 F Street, N. W., Washington, D. C. Bid forms may be obtained, and plans and specifications seen at the office of the Bureau of Public Roads, Shenandoah Life Insurance Building, Roanoke, Virginia. H. J. Spelman, District Engineer. (269)

U. S. ENGINEER OFFICE, 3RD FLOOR, PARK SQUARE BLDG., BOSTON, MASS.—Sealed Bids will be received here until 11:00 A. M., E. D. S. T., July 12, 1938, for furnishing all labor and material and performing all work for *dredging* approximately 898,900 cubic yards, scow measurement, of material in the Cape Cod Canal, Mass.: Invitation No. 175-38-140. Deposit $10.00 required for drawings, etc. Checks must be certified. Further information upon application. (270)

TENNESSEE VALLEY AUTHORITY, KNOXVILLE, TENNESSEE. Sealed bids, in duplicate, will be received until 10 A. M., Central Standard Time, July 15, 1938, and then publicly opened, for *furnishing Structural Glazed Tile* for the Guntersville Powerhouse. Bidding documents, for which there is no charge, available June 27, 1938, at above office. C. H. Garity, Director of Purchases. (278)

OFFICIAL PROPOSALS

Bids: July 8 (263)

Transporting Soil

NEW YORK, N. Y.
TRIBOROUGH - BRIDGE AUTHORITY
FOR TOPSOIL AND SOIL MULCH FROM EASTERN BOULEVARD, ON THE BRONX APPROACH, TO THE BRONX-WHITESTONE-BRIDGE

Sealed bids will be received by the Triborough Bridge Authority at its office, Administration Building, Randall's Island, Manhattan, New York City, until 11 o'clock, Daylight Saving Time, on the morning of Friday, July 8, 1938, for Topsoil and Soil Mulch from Eastern Boulevard, on the Bronx Approach, to the Bronx-Whitestone Bridge in the Borough of The Bronx, Contract No. WB-36.

All bids will be made on blank forms attached to the form of contract and specifications, and shall be accompanied by a deposit in cash or certified check in the amount of at least five per cent (5%) of the estimate total contract price bid.

Blank forms for proposals, information for bidders, contract, bond and specifications may be obtained at the office of Madigan-Hyland, Consulting Engineers, 28-04 41st Avenue, Long Island City, Queens, New York City. Contract drawings may be seen at the said office and arrangements will be made whereby prospective bidders desiring sets of blueprints of the contract drawings for their own use may secure same at cost thereof to be paid by them.

Attention is called to the fact that bids must be delivered at Randall's Island and not at 111 Eighth Avenue, nor at the office of Madigan-Hyland.

PAUL LOESER,
Director.

Dated: June 23, 1938.

Bids: July 19 (277)

Steel Superstructures

NORTH BERGEN, NEW JERSEY
THE PORT OF NEW YORK AUTHORITY
LINCOLN TUNNEL
CONTRACT MHT-74
NEW JERSEY APPROACH
STEEL SUPERSTRUCTURES
BETWEEN
STATE HIGHWAY ROUTE NUMBER 3
AND
PROSPECT AVENUE, NORTH BERGEN

Sealed proposals for the above work will be received at the office of the General Manager of The Port of New York Authority, Number 111 Eighth Avenue, Borough of Manhattan, New York City, until 10:30 Daylight Saving Time, on the morning of Tuesday, July 19, 1938, and thereafter in the Auditorium in the office of the Port Authority at the same address until 11:00 A. M., on the same date, at which latter time and place said proposals will be publicly opened and read aloud.

A more complete description of the work and full information for bidders is given in the contract papers which may be seen at the offices of The Port of New York Authority, 111 Eighth Avenue, New York City.

Complete copies of the foregoing papers will be furnished upon deposit of $25.00 per set. The deposit will be remitted if the papers are returned in good condition not later than sixty days after the opening of proposals.

The Port Authority reserves the right to waive any informalities in or to reject any or all proposals.

Each proposal must be accompanied by a certified check in the amount of $50,000.00, or by a bid bond in like amount.

The construction of the project to which this contract relates is being financed in part by the Federal Emergency Administration of Public Works.

Attention of bidders is particularly called to the requirements as to conditions of employment to be observed and minimum wage rates to be paid under the contract.

No bidder may withdraw his proposal within sixty days after the date set for the opening thereof.

THE PORT OF NEW YORK AUTHORITY
Frank C. Ferguson,
Chairman.

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ÆTNA CASUALTY & SURETY COMPANY
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CONTRACT BONDS FOR RESPONSIBLE CONTRACTORS
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OFFICIAL PROPOSALS

Bids: July 19 (266)

Landscape Development

WASHINGTON, D. C.

COMMISSIONERS, D. C., Washington, June 27, 1938. Sealed proposals will be received at Room 509, District Building, until 2:00 p. m., E. S. T., July 19, 1938, and then publicly opened, for the Landscape Development for Buildings D, E, F, and G, etc., at site of District of Columbia, Tuberculosis Sanatoria, near Glen Dale, Prince Georges County, Maryland. A more complete description of the work and full information for bidders is given in the drawings, specifications, and in other contract papers, which may be obtained at Room 427, District Building, upon deposit of a CERTIFIED CHECK payable to the COLLECTOR OF TAXES, D. C., in the sum of FIVE DOLLARS ($5.00) to insure return in good condition. Not more than three (3) complete sets of drawings and specifications and contract papers will be furnished to any one general contractor. No proposal will be accepted unless accompanied by a guaranty of not less than five percent (5%) of the amount of the bid in the form of a certified check made payable to the Collector of Taxes, D. C., U. S. bonds or the bond of an approved surety company. Security for the faithful performance of the work shall be in the form of a surety bond in a penal sum equal to the estimated total contract price. A labor bond in an amount equal to the largest estimated aggregate payroll for any one month is required. Public liability insurance in the sum of $5,000 and $10,000 is also required. The work called for by this proposal is to be performed in accordance with an agreement dated December 19, 1934, between the Commissioners of the District of Columbia and the Federal Emergency Administrator of Public Works, as amended, and is subject to the construction regulations and labor provisions of Bulletin No. 2 of the Federal Emergency Administration of Public Works dealing with Non-Federal projects, as revised. The Director of Reemployment for the District of Columbia is C. E. Lamson, 480 Indiana Ave., N. W. The Commissioners reserve the right to reject any or all proposals and waive informalities as they deem best for the interest of the District of Columbia. Final award of contract is subject to approval of the Federal Emergency Administrator of Public Works. No bidder may withdraw his proposal for a period of thirty (30) days after the date of the opening thereof. Attention is called to the fact that not less than the minimum wage rates prescribed by the Federal Emergency Administration of Public Works must be paid on this project. Melvin C. Hazen, George E. Allen, Dan I. Sultan, Commissioners, D. C.

U. S. Government

PROCUREMENT DIVISION, PUBLIC BUILDINGS BRANCH, WASHINGTON, D. C., June 6, 1938.—Sealed proposals in duplicate will be publicly opened in this office at 1 P.M., July 8, 1938, for *construction of the U.S.P.O. at Coraopolis, Pa.* Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Assistant Director, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Buildings Branch. (234)

WAR DEPARTMENT, Office of Constructing Quartermaster, Langley Field, Virginia. Sealed proposals will be received at this office until 11 A. M., Eastern Standard Time, July 26, 1938, and then publicly opened for *Construction of a Children's School* at Langley Field, Virginia. Plans and specifications will be furnished upon deposit of check in the amount of fifteen ($15.00) made payable to the Treasurer of the United States. Information at the above address. (273)

OFFICIAL PROPOSALS

Bids: July 20 (254)

Notice to Contractors

HASTINGS, NEBRASKA

Notice is hereby given that The Central Nebraska Public Power and Irrigation District (hereinafter referred to as "Owner") will receive bids for the construction of the work hereinafter described. Said bids shall be prepared in writing on forms furnished by said Owner, and shall be filed in the Office of the Secretary of said Owner at Third Street and St. Joseph Avenue in Hastings, Nebraska, on or before 11 o'clock A.M., C.S.T., July 20, 1938, at which time and place all bids will be publicly opened and read aloud in the presence of the bidders and their representatives. No bids will be received after said hour, and bids which are not prepared and filed strictly in accordance with the "Instructions to Bidders" may be rejected. Bids will be received for the construction, including the furnishing of all labor, materials, tools, equipment, transportation and services required on Group 24A.

Group 24A: Manufacture and furnish f.o.b. siding either Lexington or Elwood, Nebraska, one 25,000 H.P. vertical shaft Francis Turbine with all incidental items, all as shown on general plans for the Johnson No. 2 Power House.

The proposed construction contract together with detailed Plans and Specifications for the construction of said work may be seen at the Office of the Secretary of said Owner, and copies thereof obtained by depositing with the Secretary the sum of $25.00 which deposit will be returned upon the return of said Plans and Specifications within ten days after the bids are received.

The schedule of minimum wage rates is set forth in Article Seventh of the Agreement.

The bid must be accompanied by a certified check drawn on a bank which is a member of the Federal Reserve System, or which is a member of the Federal Deposit Insurance Corporation, in the sum of not less than 5 per cent of the amount bid. Said check shall be made payable to F. R. Kingsley, Treasurer, of said Owner. In the event a bidder, who is awarded the Contract refuses or fails to enter into such Contract, the amount of his check will be retained by said Owner as liquidated damages and not as a penalty for such failure or refusal. Bidders Bond upon forms furnished by the Owner for payment of said liquidated damages, written by an approved surety company and made payable to said Owner, may be deposited in lieu of said certified check.

The Contractor will be required at the time the Contract is executed to furnish a performance bond in an amount equal to 100 per cent of the Contract price. A copy of the required bond **is attached to the** Contract Documents.

Unless otherwise required by law, no bidder may withdraw his bid for a period of 120 days after the date of opening thereof. The Owner reserves the right to eject any and all bids and to waive any informalities therein.

THE CENTRAL NEBRASKA PUBLIC POWER AND IRRIGATION DISTRICT
Attest:
(Signed) R. O. Canaday,
Secretary.
(Signed) D. W. Kingsley,
President.

Dated this 15th day of June, 1938.

Bids: July 22 (274)

Bridge Approach

ROCKPORT, INDIANA

Sealed bids will be received by the Spencer County Bridge Commission at its office, Rockport, Indiana, until twelve o'clock noon, central standard time, July 22nd, 1938, for the construction of 13,000 feet mately 225,000 cubic yards excavating.

Payment for work to be made in Second Mortgage B. Bonds. The right is reserved to reject any and all bids.

Plans, specifications, proposal forms and further information may be obtained from Hunter and Hunt, Engineers, Fredericktown, Missouri.

Plans, profiles and specifications will be available July 12th, 1938, upon deposit of $15.00.

All proposals must be accompanied with a certified check or bidder's bond in an amount equal to 5% of the total amount of the bid.

SPENCER COUNTY BRIDGE
COMMISSION,
By Gene Scamahoru,
Secy.

OFFICIAL PROPOSALS

Bids: July 21

Planting

NEW YORK, N. Y.

TRIBOROUGH BRIDGE AUTHORITY FOR PLANTING FROM THE BRONX-WHITESTONE BRIDGE TO NORTHERN BOULEVARD ON THE QUEENS APPROACH TO THE BRONX-WHITESTONE BRIDGE

Sealed bids will be received by the Triborough Bridge Authority at its office, Administration Building, Randall's Island, Manhattan, New York City, until 11 o'clock, Daylight Saving Time, on the morning of Thursday, July 21, 1938, for Planting from the Bronx-Whitestone Bridge to Northern Boulevard on the Queens approach to the Bronx-Whitestone Bridge in the Borough of Queens, Contract No. WB-13.

All bids will be made on blank forms attached to the form of contract and specifications, and shall be accompanied by a deposit in cash or certified check in the amount of at least five per cent (5%) of the estimated total contract price bid.

Blank forms for proposals, information for bidders, contracts, bond and specifications may be obtained at the office of Madigan-Hyland, Consulting Engineers, 28-04 41st Avenue, Long Island City, Queens, New York City. Contract drawings may be seen at the said office and arrangements will be made whereby prospective bidders desiring sets of blueprints of the contract drawings for their own use may secure same at cost thereof to be paid by them.

Attention is called to the fact that bids must be delivered at Randall's Island and not at 111 Eighth Avenue, nor at the office of Madigan-Hyland.

PAUL LOESER,
Director.

Dated: June 29, 1938.

Bids: July 14 (276)

Topsoil and Mulch

NEW YORK, N. Y.

TRIBOROUGH BRIDGE AUTHORITY FOR TOPSOIL AND SOIL MULCH FROM THE BRONX-WHITESTONE BRIDGE TO NORTHERN BOULEVARD ON THE QUEENS APPROACH TO THE BRONX-WHITESTONE BRIDGE

Sealed bids will be received by the Triborough Bridge Authority at its office, Administration Building, Randall's Island, Manhattan, New York City, until 11 o'clock, Daylight Saving Time, on the morning of Thursday, July 14, 1938, for topsoil and soil mulch from the Bronx-Whitestone Bridge to Northern Boulevard on the Queens approach to the Bronx-Whitestone Bridge in the Borough of Queens, Contract No. WB-12.

All bids will be made on blank forms attached to the form of contract and specifications, and shall be accompanied by a deposit in cash or certified check in the amount of at least five per cent (5%) of the estimated total contract price bid.

Blank forms for proposals, information for bidders, contract, bond and specifications may be obtained at the office of Madigan-Hyland, Consulting Engineers, 28-04 41st Avenue, Long Island City, Queens, New York City. Contract drawings may be seen at the said office and arrangements will be made whereby prospective bidders desiring sets of blueprints of the contract drawings for their own use may secure same at cost thereof to be paid by them.

Attention is called to the fact that bids must be delivered at Randall's Island and not at 111 Eighth Avenue, nor at the office of Madigan-Hyland.

PAUL LOESER,
Director.

Dated: June 29, 1938.

Bids: July 21 (257)

Railroad Grade Crossing Protective Devices

Sealed proposals will be received by the undersigned until Noon on July 21st, 1938, for furnishing the necessary materials for seven (7) railroad grade crossing protective devices to be installed under Federal Grade Crossing Program in the State of Delaware. Further information can be obtained by contacting the undersigned.

READING COMPANY,
BY:
Clark Dillenbeck,
Chief Engineer,
Reading Terminal,
Philadelphia, Pa.

Bids: July 19 (267)

Lincoln Tunnel—New Jersey Approach

NORTH BERGEN, NEW JERSEY
THE PORT OF NEW YORK AUTHORITY
LINCOLN TUNNEL
CONTRACT MHT-74
NEW JERSEY APPROACH
STEEL SUPERSTRUCTURES
BETWEEN
STATE HIGHWAY ROUTE NUMBER 3
AND
PROSPECT AVENUE, NORTH BERGEN

Sealed proposals for the above work will be received at the office of the General Manager of The Port of New York Authority, Number 111 Eighth Avenue, Borough of Manhattan, New York City, until 10:30 Daylight Saving Time, on the morning of Tuesday, July 19, 1938, and thereafter in the Auditorium in the office of the Port Authority at the same address until 11:00 A. M., on the same date, at which latter time and place said proposals will be publicly opened and read aloud.

A more complete description of the work and full information for bidders is given in the contract papers which may be seen at the offices of The Port of New York Authority, 111 Eighth Avenue, New York City.

Complete copies of the foregoing papers will be furnished upon deposit of $25.00 per set. The deposit will be remitted if the papers are returned in good condition not later than sixty days after the opening of proposals.

The Port Authority reserves the right to waive any informalities in or to reject any or all proposals.

Each proposal must be accompanied by a certified check in the amount of $50,000.00, or by a bid bond in like amount.

The construction of the project to which this contract relates is being financed in part by the Federal Emergency Administration of Public Works.

Attention of bidders is particularly called to the requirements as to conditions of employment to be observed and minimum wage rates to be paid under the contract.

No bidder may withdraw his proposal within sixty days after the date set for the opening thereof.

THE PORT OF NEW YORK AUTHORITY,
Frank C. Ferguson,
Chairman.

U. S. Government

U. S. DEPARTMENT OF AGRICULTURE, BUREAU OF PUBLIC ROADS, Washington, D. C., June 9, 1938. SEALED BIDS will be received at the office of the Bureau of Public Roads, 1725 F Street, N. W., Washington, D. C., until 11 o'clock a.m., E.S.T., June 30, 1938, for the *construction of Project 1A2, Blue Ridge Parkway*, consisting of the *stabilization of an existing crushed stone surface together with bituminous surface treatment* and other work, length 8.496 miles, in Augusta and Albemarle Counties, Virginia. The approximate quantities of the more important items are as follows: 1000 cu.yd. excavation; 1000 tons crushed stone surfacing; 102,000 sq.-yds. stabilized stone surfacing; 240,000 gal. asphalt emulsion; 34,000 gal. refined tar; 2100 tons cover (Class A pavement); 41,000 gal. liquid asphalt. Minimum rates of wages which must be paid laborers and mechanics on this project have been fixed by the Secretary of Labor as required by law. Where plans and specifications are requested, a deposit of $5.00, certified check or cash, will be required to insure their return within 15 days after opening of bids. Checks must be made payable to the Treasurer of the United States. Plans, specifications and bid forms may be obtained at the office of the Bureau of Public Roads, 1725 F Street, N. W., Washington, D. C. Bid forms may be obtained, and plans and specifications seen at the office of the Bureau of Public Roads, Shenandoah Life Insurance Building, Roanoke, Virginia. H. J. Spelman, District Engineer. (247)

Advertisements for bids published in Engineering News-Record secure maximum competition—the most bidding by the best bidders.

Bids: July 12 (260)

State Highway Construction

STATE DEPARTMENT OF PUBLIC
WORKS, DIVISION OF HIGHWAYS,
ALBANY, N. Y.

Sealed proposals will be received by the undersigned at the State Office Building, 13th Floor, Albany, N. Y., until one o'clock p.m., advanced standard time, which is twelve o'clock noon, eastern standard time, on Tuesday, JULY 12, 1938, for the construction and reconstruction of highways and bridges in the following counties:

CONSTRUCTION

County	Deposit required	Type	Miles
Orleans	$6,000 00	18' Gravel, Bit. Treated	6 55
Oswego	5,500.00	18' Gravel, Bit. Treated	6 56

RECONSTRUCTION

County	Deposit required	Type	Miles
Chenango, Delaware, Orange, Otsego, Putnam, Rockland, Schoharie, Ulster	1,800.00	Painting various bridges on highway in Districts 8 & 9.	
Delaware	15,000 00	20' 22' Concrete 8-7-8	3 02
	1,900.00	40' I-Beam, 22' Gravel Approach	0.38
Erie	8,500.00	44' Concrete 7" & 9"	1 31
Hamilton	18,000 00	22' Concrete 8-7-8	4 06
Livingston	800 00	Double Closed Box, Two 10' Spans; Bit. Mac. M.M Opt. Appr	0.12

Maps, plans, specifications, and estimate of cost may be seen and proposal forms obtained at the office of the Division of Highways in Albany, N. Y., and at the office of the District Engineers in whose districts the roads are located, upon the payment of Five Dollars ($5.00) for plans and proposal forms. Standard specifications are Two Dollars ($2.00) per copy. No refund will be made on plans, specifications, or proposal forms. Plans and proposal forms may be seen at the office of the State Department of Public Works, State Office Building, Worth and Center Streets, New York City. The addresses of the District Engineers and Counties in each district will be furnished upon request.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specifications, and contract agreement. The attention of bidders is also directed to the special provisions applying to projects financed with federal funds.

Proposal for each highway or contract must be submitted in a separate sealed envelope with the name and number of the highway plainly endorsed on the outside of the envelope. Each proposal must be accompanied by cash, draft or certified check, payable to the order of the New York State Department of Public Works, Division of Highways, for the sum as specified in the advertisement for proposals and the proposal itself for each project. The retention and disposal of such cash, draft or check by the State Division of Highways shall conform with Sub. 2, Section 38 of the Highway Law, as amended. The successful bidder will be required to execute the contract and comply in all respects with Section 38 of the Highway Law, as amended, and also pursuant to the provisions of Chapter 707 of the Laws of 1938, there will be required on all contracts entered into by any State Agency on and after July 1, 1938, a separate bond guaranteeing prompt payment of moneys due to all persons supplying the contractor, or sub-contractor, with labor and materials employed and used in carrying out the contract as follows:

(a) Whenever the total amount payable by the terms of the contract shall be not more than $500,000 the said bond shall be in a sum equal to the total amount payable by the terms of the contract.

(b) Whenever the total amount payable by the terms of the contract shall be more than $500,000 and not more than $1,000,000 the said bond shall be in the sum of one-half of the total amount payable by the terms of the contract.

(c) Whenever the total amount payable by the terms of the contract shall be more than $1,000,000 and not more than $5,000,000 the said bond shall be in the sum of forty per centum of the total amount payable by the terms of the contract.

(d) Whenever the total amount payable by the terms of the contract shall be more than $5,000,000 the said bond shall be in the sum of $2,500,000.

The amount of the certified check accompanying the proposal of bidder to whom the contract is awarded will be returned when ten per centum of the work under the contract has been completed. If Surety Bond is dispensed with, in pursuance with the Highway Law, the amount of the bidding check will be returned when fifteen per centum of the contract work has been completed.

On contracts with federal funds, when optional types are permitted for any one item of work, contractors must state in the space provided in the proposal for this purpose the exact designation of the optional type upon which the proposal is predicated. No one proposal shall contain more than one bid for an optional item. The award, if made, will be on the basis of the responsible proposal which for all items of work gives the lowest total cost for the project and the contract will call for the type designated in such proposal.

Skilled, Intermediate Grade, and Unskilled Labor on all projects shall receive the minimum wage rate per hour as follows:

In New York City: Skilled Labor, eighty cents per hour; Intermediate Grade Labor, seventy cents per hour; Unskilled Labor, seventy cents per hour; in the ***Counties of Nassau, Suffolk and Westchester:*** Skilled Labor, seventy-five cents per hour; Intermediate Grade Labor, sixty-five cents per hour; Unskilled Labor, sixty-five cents per hour; in the ***Counties of Dutchess, Ulster, Orange and Sullivan:*** seventy-five cents per hour for Skilled Labor; Intermediate Grade Labor, fifty-five cents per hour; Unskilled Labor, fifty cents per hour with the exception of Orange County which rate is sixty cents per hour; and in all other counties other than above, Skilled Labor, seventy-five cents per hour; Intermediate Grade Labor, fifty-five cents per hour; Unskilled Labor, Forty-five cents per hour, unless shown otherwise in the itemized proposal.

The minimum hourly rate of wages for the various types of operations and trades, as well as the hours of work and conditions of employment, shall be set forth under the Special Provisions in the itemized proposal for each project.

In conformity with the provisions of Section 220, Sub-division d, of the State Labor Law, as amended, the minimum hourly rate of wages has been established and is annexed to and forms a part of the specifications for the project, and may be ascertained upon reference to the proposal for the project itself.

The right is reserved to reject any or all bids.

FRED'K STUART GREENE,
Supt. State Dept. Public Works.

Bids: July 14 (264)

Landscaping

NEW YORK, N. Y.
TRIBOROUGH BRIDGE AUTHORITY
FOR THE PLANTING FROM EASTERN BOULEVARD, ON THE BRONX APPROACH, TO THE BRONX-WHITESTONE BRIDGE

Sealed bids will be received by the Triborough Bridge Authority at its office, Administration Building, Randall's Island, Manhattan, New York City, until 11 o'clock, Daylight Saving Time, on the morning of Thursday, July 14, 1938, for Planting from Eastern Boulevard, on the Bronx Approach, to the Bronx-Whitestone Bridge in the Borough of The Bronx, Contract No. WB-37.

All bids will be made on blank forms attached to the form of contract and specifications, and shall be accompanied by a deposit in cash or certified check in the amount of at least five per cent (5%) of the estimated total contract price bid.

Blank forms for proposals, information for bidders, contract, bond and specifications may be obtained at the office of Madigan-Hyland, Consulting Engineers, 28-04 41st Avenue, Long Island City, Queens, New York. Contract drawings may be seen at the said office and arrangements will be made whereby prospective bidders desiring sets of blueprints of the contract drawings for their own use may secure same at cost thereof to be paid by them.

Attention is called to the fact that bids must be delivered at Randall's Island and not at 111 Eighth Avenue, nor at the office of Madigan-Hyland.

PAUL LOESER,
Director.

Dated: June 23, 1938.

OFFICIAL PROPOSALS

Bids: July 7 (243)

State Highway Work

STATE DEPARTMENT OF PUBLIC WORKS, DIVISION OF HIGHWAYS, ALBANY, N. Y.

Sealed proposals will be received by the undersigned at the State Office Building, 13th Floor, Albany, N. Y., until one o'clock p.m., advanced standard time, which is twelve o'clock noon, eastern standard time, on Thursday, July 7, 1938, for the construction and reconstruction of highways and bridges in the following counties:

CONSTRUCTION

County	Deposit required	Type	Miles
Cattaraugus.	$6,200.00	18′ Gravel, Bit. Treated; 18′ Bit. Mac. M.M. Type 3	4.88
Dutchess...	65.00	Driven Well at Gas Sta. # 2.	....
Nassau.....	800.00	Roadside Improvement & Misc. Work.........	....
Oneida	3,200.00	18′ Gravel, Bit. Treated ...	3.27
Tompkins...	2,500.00	18′ Gravel, Bit. Treated ...	3.14
Wayne.....	1,800.00	18′ Gravel, Bit. Treated ...	2.61
RECONSTRUCTION			
Broome.....	24,000.00	22′ Concrete 8-7-8 including raising bridge; Two 160′ spans...............	6.02
Chenango & Otsego....	9,500.00	22′ Concrete 8-7-8........	2.14
Monroe.....	6,500.00	44′ Concrete 8″ Var. Dual Type..............	1.10
Schuyler....	5,500.00	22′ Concrete; 40′ I Beam & Bit. Mac. M.M. Opt. Appr.............	1.43
Westchester.	2,900.00	20′ Bit. Mac. M.M. Opt....	0.67

Maps, plans, specifications and estimate of cost may be seen and proposal forms obtained at the office of the Division of Highways in Albany, N. Y., and at the office of the District Engineers in whose districts the roads are located, upon the payment of Five Dollars ($5.00) for plans and proposal forms. Standard specifications are Two Dollars ($2.00) per copy. No refund will be made on plans, specifications, or proposal forms. Plans and proposal forms may be seen at the office of the State Department of Public Works, State Office Building, Worth and Center Streets, New York City. The addresses of the District Engineers and Counties in each district will be furnished upon request.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specifications, and contract agreement. The attention of bidders is also directed to the special provisions applying to projects financed with federal funds.

Proposal for each highway or contract must be submitted in a separate sealed envelope with the name and number of the highway plainly endorsed on the outside of the envelope. Each proposal must be accompanied by cash, draft or certified check, payable to the order of the New York State Department of Public Works, Division of Highways, for the sum as specified in the advertisement for proposals and the proposal itself for each project. The retention and disposal of such cash, draft or check by the State Division of Highways shall conform with Sub. 2, Section 38 of the Highway Law, as amended. The successful bidder will be required to execute the contract and comply in all respects with Section 38 of the Highway Law, as amended, and also pursuant to the provisions of Chapter 707 of the Laws of 1938, there will be required on all contracts entered into by any State Agency on and after July 1, 1938, a separate bond guaranteeing prompt payment of moneys due to all persons supplying the contractor, or sub-contractor, with labor and materials employed and used in carrying out the contract as follows:

(a) Whenever the total amount payable by the terms of the contract shall be not more than $500,000 the said bond shall be in a sum equal to the total amount payable by the terms of the contract.

(b) Whenever the total amount payable by the terms of the contract shall be more than $500,000 and not more than $1,000,000 the said bond shall be in the sum of one-half of the total amount payable by the terms of the contract.

(c) Whenever the total amount payable by the terms of the contract shall be more than $1,000,000 and not more than $5,000,000 the said bond shall be in the sum of forty per centum of the total amount payable by the terms of the contract.

(d) Whenever the total amount payable by the terms of the contract shall be more than $5,000,000 the said bond shall be in the sum of $2,500,000.

The amount of the certified check accompanying the proposal of bidder to whom the contract is awarded will be returned when ten per centum of the work under the contract has been completed. If Surety Bond is dispensed with, in pursuance with the Highway Law, the amount of the bidding check will be returned when fifteen per centum of the contract work has been completed.

On contracts with federal funds, when optional types are permitted for any one item of work, contractors must state in the space provided in the proposal for this purpose the exact designation of the optional type upon which the proposal is predicated. No one proposal shall contain more than one bid for an optional item. The award, if made, will be on the basis of the responsible proposal which for all items of work gives the lowest total cost for the project and the contract will call for the type designated in such proposal.

Skilled, Intermediate Grade, and Unskilled Labor on all projects shall receive the minimum wage rate per hour as follows:

In New York City: Skilled Labor, eighty cents per hour; Intermediate Grade Labor, seventy cents per hour; Unskilled Labor, seventy cents per hour; in the Counties of Nassau, Suffolk and Westchester; Skilled Labor, seventy-five cents per hour; Intermediate Grade Labor, sixty-five cents per hour; Unskilled Labor, sixty-five cents per hour; in the Counties of Dutchess, Ulster, Orange and Sullivan, seventy-five cents per hour for Skilled Labor; Intermediate Grade Labor, fifty-five cents per hour; Unskilled Labor, fifty cents per hour with the exception of Orange County which rate is sixty cents per hour; and in all other counties other than above, Skilled Labor, seventy-five cents per hour; Intermediate Grade Labor, fifty-five cents per hour; Unskilled Labor, forty-five cents per hour, unless shown otherwise in the itemized proposal.

The minimum hourly rate of wages for the various types of operations and trades, as well as the hours of work and conditions of employment, shall be set forth under the Special Provisions in the itemized proposal for each project.

In conformity with the provisions of Section 220, Sub-division d, of the State Labor Law, as amended, the minimum hourly rate of wages has been established and is annexed to and forms a part of the specifications for the project, and may be ascertained upon reference to the proposal for the project itself.

The right is reserved to reject any or all bids.

FRED'K STUART GREENE,
Supt. State Dept. Public Works.

Bids: July 6 (251)

TRIBOROUGH BRIDGE AUTHORITY

For the Paving at Northern Boulevard on the Queens Approach to the Bronx-Whitestone Bridge

NEW YORK, N. Y.

Sealed bids will be received by the Triborough Bridge Authority at its office, Administration Building, Randall's Island, Manhattan, New York City, until 11 o'clock, Daylight Saving Time, on the morning of Wednesday, July 6, 1938, for paving at Northern Boulevard on the Queens approach to the Bronx-Whitestone Bridge in the Borough of Queens, Contract No. WB-27.

All bids will be made on blank forms attached to the form of contract and specifications, and shall be accompanied by a deposit in cash or certified check in the amount of at least five per cent (5%) of the estimated total contract price bid.

Blank forms for proposals, information for bidders, contract bond and specifications may be obtained at the office of Madigan-Hyland, Consulting Engineers, 28-04 41st Avenue, Long Island City, Queens, New York City. Contract drawings may be seen at the said office and arrangements will be made whereby prospective bidders desiring sets of blue prints of the contract drawings for their own use may secure same at cost thereof, to be paid by them.

Attention is called to the fact that bids must be delivered at Randall's Island and not at 111 Eighth Avenue, nor at the office of Madigan-Hyland.

PAUL LOESER,
Director.

Dated: June 22, 1938.

YOU GET national competition on your request for bids in the Official Proposal Columns of
ENGINEERING NEWS-RECORD

OFFICIAL PROPOSALS

Bids: July 7

Sewer Paving and Repair

BUFFALO, NEW YORK
BUFFALO SEWERS

P. W. A. Project No. N. Y. 1034-R

Sealed bids for miscellaneous paving restoration and repairs, as a part of the Intercepting Sewer and Sewage Treatment Plant Project, will be received by the Buffalo Sewer Authority at Room 1032, City Hall, Buffalo, New York, until 11:00 a. m., Eastern Daylight Saving Time, on the 7th day of July, 1938, at which time they will be publicly opened and read aloud.

The work comprises a single contract division known as Division CC—Mineral Spring Road Paving, and includes the construction of approximately 2500 square yards of reinforced concrete pavement base 8 inches thick, the removal of approximately 600 square yards of old asphalt topping and binder, the furnishing and placing of approximately 235 tons of 1½″ binder course, approximately 420 tons of asphalt topping for 2″ surface course and for skin patching, and approximately 400 gallons of hot asphalt cement for skin patching, the blowing out and sealing with hot asphalt cement of approximately 2,000 linear feet of cracks in old pavement, and the re-setting of approximately 100 linear feet of stone curbs.

Proposals are to be made and contracts awarded on the basis of unit price bids. The instructions to bidders, form of proposal, form of contract, specifications, plans, and forms of proposal, performance and maintenance surety bonds may be examined at the office of the Buffalo Sewer Authority, Room 1032, City Hall, Buffalo, New York, and a copy thereof may be obtained upon a deposit of $25.00, to be refunded upon return of plans and documents in good condition within 30 days after the opening of the bids.

The Buffalo Sewer Authority reserves the right to waive any informalities in or reject any or all bids. No bids will be accepted, however, except with the prior approval of the Project Engineer of the Federal Emergency Administration of Public Works.

Bid security by cash or certified check in the amount of $1,000, or a proposal bond in the amount of $5,000, is required, subject to the conditions provided in the Instructions to Bidders.

This contract is to be financed by a loan and grant from the Federal Emergency Administration of Public Works.

Attention of bidders is particularly called to the requirements as to conditions of employment to be observed and minimum wage rates to be paid under the contract.

No bidder shall withdraw his bid within 45 days after the actual date of the opening thereof.

Any bidder may withdraw his bid prior to the scheduled closing time for receipt of bids or authorized postponement thereof.

BUFFALO SEWER AUTHORITY
(Signed) Daniel H. McCarriagher,
Chairman.

Dated: June 23, 1938.

EMPLOYMENT,
BUSINESS OPPORTUNITIES,
AND
EQUIPMENT WANTED
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Engineering News-Record

Where-to-Buy

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Add years of efficient service to your equipment by having it rebuilt by us. All work done by thoroughly trained men who are experts in equipment rebuilding. No skimping to save at the expense of the job.

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1—Lorain, Model "60", 1 yd., 4 cyl. Waukeshan Engine, enclosed steel cab on crawlers.
1—Bay City, Model "R", ¾ yd., 4 cyl. Climax engine, enclosed steel cab, on crawlers.
1—Osgood, ¾ yd., 6 cyl. Le Roi engine, self starter, enclosed steel cab, on crawlers.
1—Bay City, Model "K", ½ yd., 4 cyl. International engine, enclosed steel cab, on crawlers.
1—P. & H., Model "300", ½ yd., 4 cyl. Buda engine, enclosed steel cab, on crawlers.
1—Unit, Model "514", ½ yd., 4 cyl. Waukeshan engine, enclosed steel cab, on crawlers.
2—Bay City Tractor Shovels, ⅜ yd., McCormick-Deering Power.

SHOVELS, STEAM

2—Massillon, 1 yd., on crawlers.
1—Bucyrus-Erie, ⅞ yd., on crawlers.

CRANES, GASOLINE

1—Lorain, "60", 1 yd., 45 ft. boom, on crawlers.
1—O. & S., ¾ yd., 35 ft. boom, on crawlers.
1—Northwest, ¾ yd., 40 ft. boom, on crawlers.
1—Bay City Tractor Crane, 25 ft. boom, on crawlers.

DITCHERS, GASOLINE

1—Osgood, ¾ yd., 6 cyl. Le Roi engine, Trench Hoe, on crawlers.
1—Bay City, "R", ¾ yd., 4 cyl Climax engine, Trench Hoe, on crawlers.
2—Bay City, 16-B, ¾ yd., 4 cyl. Climax engine, Trench Hoe, on crawlers.
1—Bay City, "K", ½ yd., 4 cyl. International engine, Trench Hoe, on crawlers.
3—Bay City Tractor Ditchers, ⅜ yd., on crawlers.
1—Insley, "C", ⅓ yd., 4 cyl. engine, Trench Hoe, on crawlers.

DITCHER ATTACHMENTS

1—Osgood, 1 yd. Trench Hoe attachment, complete.
1—Osgood, ¾ yd. Trench Hoe attachment, complete.
2—Bay City, ⅜ yd. Trench Hoe attachments, complete.
1—Insley, ⅓ yd. Trench Hoe attachment, complete.

SHOVEL ATTACHMENTS

1—Bucyrus-Erie, 1 yd Shovel Attachment, rope crowd, for gasoline driven shovel.
1—Northwest, ¾ yd. Shovel Attachmen, rope crowd.
1—P. & H. Model "300", ½ yd. Shovel Attachment, chain crowd.
1—Bucyrus-Erie, B-2, ⅞ yd. Steam Shovel Attachment complete.

ROAD GRADER

1—Wehr, 1932, 8 ft. blade, McCormick-Deering Power, mounted on pneumatic tires. Used very little.

TRUCK CRANES

1—Universal, 25 ft. boom, mounted on A.C. Mack chassis.
1—P. & H., 25 ft. boom, mounted on A.C. Mack chassis.

TRUCK LOADERS

1—Nelson, Q-7, crawler mounted, heavy duty, self feeding truck loader, with McCormick-Deering Power.

AIR COMPRESSORS

1—Chicago Pneumatic, 100 ft. single stage, gasoline driven, portable on solid rubber tires.

PUMPS

A large assortment of gasoline driven pumps, mostly single and double diaphragm.

ROAD ROLLERS

1—Buffalo Springfield, 14½ ton, Highway Maintenance, 3 wheel steam roller, with scarifier, excellent condition.
1—Buffalo Steam Roller, 10 ton, 3 wheel, with scarifier.
1—Acme, Type "A", 10 ton, 3 wheel, 4 cyl. gasoline roller.
1—Austin, 8 ton, tandem, 2 cyl. gasoline roller.
2—Acme 5 ton, 3 wheel gasoline Rollers, with scarifiers.

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AIR COMPRESSORS

20—Port. gas driven Ingersoll Rand, Chgo. Pneu., Sullivan, Barnes, Schramm & Gardner Denver: 3—309′; 3—220′; 3—160′; 10—120′; 1—92′.
8—Stationary belt driven with low & high pressure cyls. Ing. Rand, Chgo. Pneu. Tool, Sullivan & Gardner Denver. All sizes up to 1,250′.

BINS

2—3-compartment with scales, 10,000# cap.: 1—150 ton Blaw Knox; 1—112 ton Butler.
10—2-compartment: 3—118 ton Blaw Knox; 1—117 ton Blaw Knox; 1—87 ton Blaw Knox; 1—54 yd. Johnson; 1—60 ton Butler; 2—35 ton Blaw Knox; 1—26 ton Heltzel. With or without weigh batchers.
1—1,200 bbl. Blaw Knox round bulk cement bin with 2,000# weigh batcher.
2—275 bbl., 1—car, port. bulk cement plant with 1,000# weigh batcher, bucket elevator & car unloaders: 1—Butler; 1—Johnson.

BOILERS

5—Horizontal, 50, 70, 80 100 & 150 HP. Johnson Bros., Penn. & Erie Iron Wks.
78—Vertical boilers from 8 to 50 HP.

BUCKETS

1—4 yd. Hayward class G clamshell.
35—Williams, Blaw Knox, Owen & Kiesler clamshell in all sizes & types.
4—Dragline: 1—1½ yd. Omaha; 1—1½ yd. Page class C; 1—1¼ yd. Page class C; 1—¾ yd. Page class C.
4—Dragscraper: 2—1 yd. Green & Cedar Rapids; 1—¾ yd. Sauerman; 1—½ yd. Green.

CONVEYORS

7—Port. belt conveyors with steel frames, gas or elec. power: 4—18″ (2—45′ Barber Greene; 1—32′ National; 1—24′ Chgo. Automatic); 3—12″x20′ Barber Greene & Portable.
1—18″ Barber Greene style #51 belt feeder.

CRANES, DRAGLINES AND SHOVELS

1—Link-Belt K-55, ser. #1698, 70′ boom, 2 yd. bucket; also have 2 yd. shovel attachment.
2—Northwest mod. 104, ser. nos. 2079 & 1597, 45′ booms, 1¼ yd. buckets; one with 1 yd. shovel attachment.
1—Link-Belt mod. K-42, ser. #1265, 45′ boom, 1¼ yd. bucket; also have 1 yd. trench hoe attachment or 1¼ yd. shovel front.
2—Northwest mod. 105, ser. nos. 2053 & 1522, 40′ booms, 1 yd. buckets.
1—American Gopher #GS-184, 60′ boom, 1 yd. bucket.
1—Link-Belt mod. K-1, ser. #1024, 50′ boom, 1 yd. bucket.
1—Moore Speed crane #179 with 70′ boom, 1 yd. bucket.
1—Osgood Heavy Duty, ser. #2069, 40′ boom, 1 yd. bucket & with 1 yd. shovel attachment.
1—Bucyrus-Erie mod. 1030, ser. #10512, 45′ boom & ¾ yd. shovel front.
1—Northwest mod. #2, ser. #4797, 40′ boom, ½ yd. bucket.
1—Brownhoist No. 1, ser. #10057, 30′ boom, ½ circle swing, ½ yd. bucket.
2—Erie type B-2, ser. nos. 4122 & 4372 steam cranes & shovels, 50′ boom, 1 yd. buckets.
4—SHOVEL FRONTS: 1—2 yd. for Link Belt K-55. 1—1¼ yd. shovel front. 2—1 yd. trench hoes for Link Belt K-42, K-38 or K-2.

Uncle Sam has rolled up his sleeves!

The Government is definitely speeding up construction work. That means that many contractors are faced with the necessity of spending big money for mechanical equipment—*quick*—millions in fact!

Lots of this work will need *new* equipment. But millions of dollars can be *saved* by judicious buying or renting of GUARANTEED used equipment.

"E.C.A." brings such a GUARANTEE to the construction field. Our 35 years of experience have taught us how to REBUILD equipment properly. "E.C.A." has put the "used equipment" business on a definitely understandable basis. You buy or you rent certain equipment for certain work—with the "E.C.A." GUARANTEE that it will do that work for which it was designed. That's all there is to it. If you could see our modern rebuilding shops, talk with our experts and look over our mammoth stocks—you'd quickly be convinced.

Remember — over 3,200 satisfied "E.C.A." customers—3 big stock centers at nearby points — and the GUARANTEE behind every item you select.

DERRICKS

6—All steel stiffleg derricks: 1—15 ton Dobbie, 100′ boom; 1—15 ton Clyde, 100′ boom; 1—15 ton Clyde "A" frame barge derrick, 50′ boom; 1—10 ton Insley, 80′ boom; 1—7½ ton, 120′ boom; 1—5 ton Insley, 80′ boom.
6—Steel guy derricks: 1—15 ton Terry, 115′ mast, 100′ boom; 1—10 ton American, 115′ mast, 100′ boom; 3—6 ton Bedford, 90′ mast, 80′ boom; 1—5 ton Dobbie, 70′ mast, 58′ boom.

HAMMERS

27—Pile hammers, Vulcan & McKiernan Terry, all sizes.
2—Pile extractors: 1—Vulcan #800 & 1—McKiernan-Terry size E-2.

HOISTS

Electric ranging from 20 HP up to 125 HP, consisting of triple-drum, double-drum & single-drum, with A.C. or D.C. motors, some with attached swingers. Following makes: American, Clyde, Lambert, Lidgerwood, Thomas. (55 in stock.)
Gas hoists ranging from 8 to 120 HP, single, double & triple-drums; all standard makes. (38 in stock.)
Steam, ranging from 8 HP to 60 HP, single, double & triple-drum, all standard makes.

LOCOMOTIVES

32—Gas. locomotives from 20 ton to 2 ton, standard, 36″ & 24″ ga.
6—Elec. storage battery 24″ ga.; 4—4 ton Whitcomb; 2—5 ton Atlas.

MIXERS

135—Concrete mixers, sizes 2 yd., 1½ yd., 1 yd., ¾ yd., ½ yd., ⅓ yd. & ¼ yd. elec. & gas driven with side loader or batch hoppers.
5—Union Iron Wks., air operated grout mixers, built for 350# W.P.

PAVERS

5—Foote, ser. nos. 4243, 4135, 3954, 3923 & 3861.
1—Rex #9568.
2—Ransome nos. 9102 & 9681, with tower apparatus.
1—Koehring, ser. #15211.

PUMPS

155—Centrifugal & force pumps, all sizes & types, with elec., gas or steam power.

PUMPCRETE PLANT

1—Rex. mod. #200 dual pumpcrete with rotary feeder & elec. power.

TRACTORS

3—Allis Chalmers mod. L tractors, nos. 682, 637 & 942, with Baker hydraulic bulldozers.
4—Caterpillar: 1—Mod. 65, ser. #2-D-201; 2—Mod. 60, ser. nos. 5842 & 5874; 1—Mod. 30, ser. #7969.

WAGONS

3—8 yd. Athey crawler wagons, 3-way, hydraulic dump.
9—6 yd. & 3 yd. LaPlante-Choate, bottom dump, wheel mounted.

WHIRLEY

1—Wiley Whirley mod. 75 #2973, 20 ton cap., 75′ boom, 3-drum Clyde 80 HP elec. hoist & 30 HP elec. swinger; all complete. Perfect condition.

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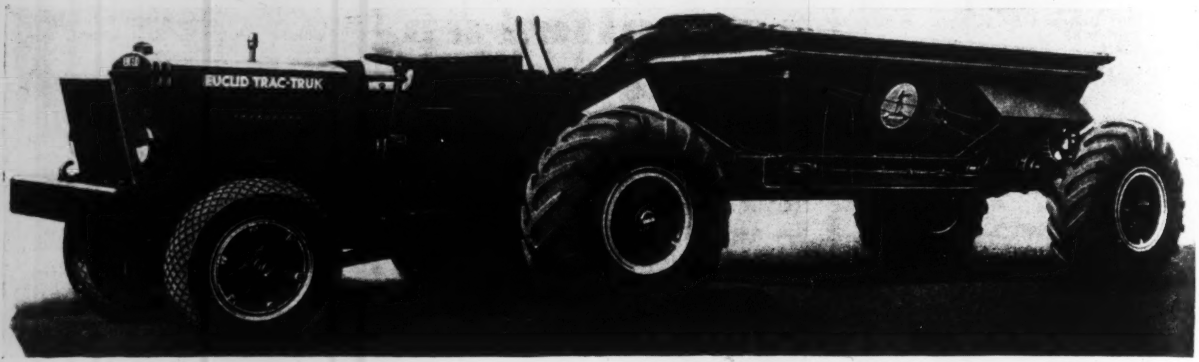

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1—Large Factory Rebuilt #0 Union Pile Hammer, following specifications: 13,500#—Energy developed per blow 19,850 foot pounds. Blows per minute 110—Boiler required 50 HP. Cost new $4,200. Our price............... **$750.00**

1—Factory rebuilt ¾ yard P&H shovel like new **$3,500.00**

50—Rebuilt Ingersoll-Rand and Chicago Pneumatic Jackhammers—One fourth regular price.

4—30 Ton ALL STEEL STIFF LEG DERRICKS—Manufactured by American Terry Company—Complete with bull wheels, sills, all fittings, etc. 65 and 75' booms .... **$1,500.00** ea.

1—Midwest 12 Ton capacity—36 Gauge Gasoline Locomotive. New in 1933. Used three months. Price.... **$1,500.00**

1—Set Fittings for bucket operating wood derrick **$200.00**

2—120' Schramm Gasoline Compressor late model **$475.00**

1—160' Ingersoll Rand Compressor. **$550.00**

4—310 Ingersoll Rand Compressor, rubber tire mount—gasoline operated.... **$950.00**

1—Pair 450 HP late model Diesel Engines —Suitable any type stationary or marine work. Price on application.

2—Euclid Five yard caterpillar mount crawlers —bottom dump—practically new. Price................. **$500.00** ea.

1—Model 100 Cletrac Tractor—No bull dozer. Rebuilt **$1,000.00**

1—Model 20 Caterpillar Tractor—No bulldozer **$600.00**

8—Rebuilt Model 60 Caterpillar tractors —with bull dozer **$1,250.00**

50—New 2—KW—Single cylinder—air cooled, light plants—32 and 110 volts.. **$150.00** ea.

1—Complete ROCK CRUSHING PLANT located Milburn, New York, consisting of No. 6 American Machinery Jaw Crusher—SN160087—1—42"x18" revolving Screen with gearing and 1 Bucket Elevator 30' centers—Price for the lot as is, where is................. **$1,000.00**

10—Ingersoll Rand Paving Breakers. Rebuilt Air tools of all kinds.

1—Rebuilt Northwest Crane model 105—50' Boom, like new, $4,000.

1—Austin Roller, 5 ton, powered with Fordson gas motor #732333.

1—Portable Compressor, Chicago Pneumatic—Little Giant air Motor #24065 —5½x5 P6D6L 6 Gas Motor #58391 4¼x5 C Model OXC Hercules.. **$500.00**

SPECIFICATIONS EUCLID END DUMP TRUCKS

12—Euclid Trac-Truk—& Trailer #20—Truck No. 1ZWK20—Motor No. 361872 —Waukesha—Motor Model 6SRK69G. Trailer No. 42W1581. (Other serial numbers of same series.)

2—Ingersoll-Rand Wagon Drills—Serial No. 3996 with X71 Drifter #418395 and Air Hoist No. A3006.... **$500.00** ea.

1—Square Deal #20 Road Scraper, Ser. #5752, manufactured J. D. Adams & Co. Indianapolis, Ind.

1—Pressure Tank—Mass. Inspection 11' long—4' Dia.

1—Pressure Tank—7½' long—3½' Dia.

1—Pressure Tank—4' long—2' Dia.

4—Pontoons—22'—3' Dia.

1—Gas Tank—5½' long—4' Dia.

1—Gasoline Locomotive Whitcomb, 4 ton —36" Gauge, Ser. #138-4-4261—Bore 4"x4½" .... **$400.00** ea.

1—Gasoline Locomotive Whitcomb, 5 ton, 36" Gauge Type CS4—#12657—Motor Continental Type 102 #84-16050...... **$500.00** ea.

1—Gasoline Locomotive Whitcomb, 5 ton, 36" Gauge Type CS4-12686—Motor Continental Type 102 #85-16045..... **$500.00** ea.

1—Farrel Jaw Crusher—Size 24"x13"—Type B, belt driven **$650.00**

1—Acme Jaw Crusher—Size 20"x12" Type 9AA Serial #1338—Belt Driven. **$450.00**

1—Gravel Washing & Screening plant, consisting of revolving screen 32"x15' —bucket elevator 25' CC 6"x14" buckets, reciprocating feeder 14"x12", wash box 17'x40" wide, and necessary drive sprockets and chains, bote, entire plant is complete .... **$450.00** lot

1—Blaw Knox steel 2 compartment bin bottom, with 2 quadrant dump gates .**$150.00**

1—Telsmith rotary grizzily and two feeders—grizzily 7'8" long. 4'6" dia. 8" spacing feeders each 36" wide, 6'6" long **$650.00**

1—Stiff leg wood derrick, 50' boom. mast—10' bull wheel........... **$250.00**

7—Steel stone boxes, 4'0"x4'0"x4. **$25.00** ea.

2—Steel Switch houses 4'6"x7'.

2—Norton 50 Ton Jacks....... **$50.00** ea.

Spare parts for Trucks, chain blocks, office furniture, etc

Six Cleated Belt Loaders for sand, coal or gravel, gasoline and electrically operated, portable **$250.00**

1—Nelson Automatic Loader mounted on Fordson Tractor gasoline operated. **$500.00**

2—Farquhar Locomotive Type Boilers—ASME—25 Horsepower, good condition **$200.00**

Ten Electric and Gasoline Hoisting Engines—single double and three drum. Price on application.

Large quantities of Chain blocks, jacks, gasoline engines, diesel engines, wire rope of all sizes, chain, etc.

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18—Portable gasoline drive from 110 to 330 cu. ft.
6—Stationary Electric from 450 to 1300 cu. ft. high, plow pressure type

BATCHING BINS

3—Blaw Knox Bins, 3 compartment, 70 and 110 Tons—3 beam scales
1—Blaw Knox 2 compartment, 70-Ton—2 beam scales

BOILERS

8—Vertical and Locomotive type, 30 to 125 H.P.—A.S.M.E. and National Board

BUCKETS

12—Clamshell, Dragline and Orange Peel—½ to 2 cu. yard

CRANES, DRAGLINES AND SHOVELS

1—Link Belt—K-55 Serial #1701, 80′ boom Dragline—Gasoline
1—Koehring Model 703—Dragline—70′ boom—Gasoline
1—Lorain 75 D. Shovel, 1¼ cu. yard, oversize engine—Gasoline—Shop #5500
1—Lorain 75B, Combination Shovel and Back Hoe—Gasoline—1¼ cu. yard
1—Industrial Brown Hoist Crane, 50′ or 80′ boom—117 Ton Capacity—Gasoline—Shop #5229
1—Brown Hoist #2, Crane 40′ boom, 10 Ton Capacity—Gasoline—Shop #10,018
1—Little General, combination Crane, Shovel and Back Hoe—½ yard Capacity—Gasoline—Shop #1471
3—25 Ton Browning Locomotive Cranes, Steam operated, standard gauge, all with late style trucks, 50′ booms

DERRICKS

2—American, Steel stiff leg, 10 Tons Capacity—100′ booms
3—American Guy Derricks—15 Ton Capacity—115′ masts, 100′ booms

GRADERS

1—Allis Chalmers, 1—Caterpillar Auto Patrol, pneumatic tires, dual drive, Gasoline and Diesel

HAMMERS

3—Vulcan, 1—size #1, 2 size #2
4—McKierman Terry—size #7—#9B3 and #11B3

HOISTS

6—Electric from 30 H.P. to 100 H.P. single, double and triple drum with and without swingers
8—Gasoline from 15 to 80 H.P. single and double drum

LOCOMOTIVES

1—Plymouth, Gasoline, Standard Gauge M.C.B. Couplers, 12 Ton
1—Plymouth, Gasoline, Standard Gauge M.C.B. Couplers, 20 Ton

TRACTORS

2—RD 6 Caterpillar Diesel
1—RD 7 Caterpillar Diesel all with bulldozers

ROAD ROLLERS

2—Buffalo Springfield, 10 Ton, 3 Wheel, both with scarifiers, Gasoline straight line
1—Austin Western, 5 Ton, 3 Wheel, Gasoline
1—Buffalo Springfield Tandem, 5 Ton, Steam

If the item you require is not listed above, please write us as we may have it.

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12 Sullivan Gasoline Portables—110', 160', 310'.
1 Ingersoll-Rand Gasoline Portable 90'.
3 Sullivan Electric Portables 120'.
1 Sullivan WJ-3 400' 2 stage, Electric or Gasoline Driven on skids.

AIR TOOLS

200 Sullivan, Chicago, Ingersoll & Thor. Rockdrills, Breakers, Chippers, Rivet Hammers, Grinders, Wrenches, Sump Pumps, Sheeting Hammers, Rivet Busters, Reversible & Non-Reversible drills for wood or steel.

BELT CONVEYORS

2 Portable Conveyors 50' and 60' with 24" belts, gas and electric driven.
2 Stationary Conveyors 60' & 75' with 24" belts, gas and electric driven.

CONCRETE VIBRATORS

6 White Vibrators, gas and electric driven, all with 21' of drive, and heads from 1⅝" to 3½" diameter.

DERRICKS

3 30 Ton American Terry Guy Derricks, 90' masts, 80' booms, complete with all blocks, guys, turnbuckles, etc.,
1 10 Ton Guy Derrick, 90' mast, 80' boom, complete with all blocks, guys, turnbuckles, etc.,
1 5 Ton A frame Derrick, 50' boom.
2 1 Ton 20' Chicago Booms.

ELECTRIC MOTOR & CONTROLS

400 AC Hoisting duty motors from 5 HP to 150 HP
200 DC Hoisting duty motors from 6½ HP to 100 HP

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1 Schramm Gasoline driven portable welder with 2-300 ampere G.E. generators mounted on 4 solid rubber tired wheels.

JUST WHAT YOU NEED MAY BE IN THIS LIST

LOOK IT OVER CAREFULLY

HOISTS

400 Single Drum Gasoline and Electric, 8 HP to 125 HP
100 Double Drum Gasoline and Electric, 8 HP to 150 HP
1 Three Drum Lidgerwood 60 HP Electric Driven with 7½ HP independent swinger.
1 Three Drum Lambert 60 HP Electric Driven with 10 HP independent swinger.
10 Three Drum Thomas 60 HP Electric Driven with attached swinger.
8 Three Drum Thomas 125 HP Electric Driven with attached swinger.
3 Three Drum Thomas 120 HP Gasoline Driven with attached swinger.

MATERIAL ELEVATOR & BUCKET EQUIPMENT

200 1, 2 and 3 wheelbarrow material elevators complete with guides, heads, cable, sheaves, etc.,
75 7', 14', 21', 27', 36' and 42' Concrete Bucket Outfits complete with guides, heads, cable, sheaves, etc.,

GASOLINE ENGINES

200 Engines from 2 HP to 120 HP

MIXERS

1 28S Jaeger-Lakewood Gasoline or Electric d[illegible] with Power Loader, water tank, power [illegible] charge, mounted on steel wheels.
6 Construction Machinery Co., Ransome, K[illegible]ing, 28S Concrete Mixers, Gasoline and El[illegible] Driven.
6 Construction Machinery Co. and Ransome, [illegible] Concrete Mixers, gas and electric driven.
3 Construction Machinery Co. 21S Con[illegible] Mixers, with power loaders, gas and el[illegible] driven.
10 Construction Machinery Co. and Ransome [illegible] concrete mixers, gas and electric driven.
6 Construction Machinery Co. 14S con[illegible] mixers with power loaders, gas and el[illegible] driven.
20 Construction Machinery Co. Plaster Mixers, [illegible] 6 and No. 10, gas and electric driven.

PUMPS

12 Sterling, self-priming Centrifugal Pumps, [illegible] line driven, 2", 3", 4", 6", 8".
1 Worthington, 2 stage Centrifugal Pump, [illegible] gals. @ 150#, driven by 50 HP electric [illegible]
3 Domestic, Triplex Pumps 60 gals. @ [illegible] gasoline and electric driven.
10 3" and 4" Barnes and Domestic Singl[illegible] Double Plunger gas and electric driven.

SAW TABLES

1 Construction Machinery Co. Power Sawyer, [illegible] blade with 5½ HP electric motor.
2 Hutchinson combination woodworking [illegible] overhead saw tables.
8 Construction Machinery Co. Power Sawyers [illegible] blades with 12 HP gas engine.
6 Sterling stationary top saw tables, 10" combi[illegible]tion blade with 4 HP air-cooled gas en[illegible]

STORAGE BINS

1 Butler X100, 150 ton Three Compartment storage bin with weighing batchers.

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Asphalt plants 1250 yd., 1800 yd.
Blaw-Knox Bulk Cement Plant
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50 HP **Elec. shaft hoists**
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4—**Ingersoll-Rand 110′ compressors** on skids
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POSITIONS WANTED

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Water Purification — Sewage Treatment
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Gustav J. Requardt — Robert T. Regester
Benjamin L. Smith — Theodore W. Hacker

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UTILITIES

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M. Am. Soc. C. E.

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Boston, Mass., Tremont Bldg.

Samuel M. Ellsworth

M. Am. Soc. C. E.
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Charles W. Sherman — John P. Wentworth
Almon L. Fales — Harrison P. Eddy, Jr.
Frank A. Marston — Arthur L. Shaw
E. Sherman Chase

Water, Sewage, Drainage, Garbage and Industrial Wastes Problems
Laboratory — Valuations

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The Thompson & Lichtner Co., Inc.

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Directory of Engineers

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Morrell Vrooman

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Union Iron Works, Inc., Elizabeth, N. J.

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Byrne Doors, Inc., Detroit, Mich.

ANCHORS, Expansion
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Lancaster Iron Wks., Inc., Lancaster, Pa.

BARS, Iron and Steel
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., (U. S. Steel Corp. Sub.), Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Timken Roller Bearing Co., Canton, Ohio
Youngstown Sheet & Tube Co., Youngstown

BATCHERS, Adjustable Measuring
Blaw-Knox Co., Pittsburgh, Pa.
Jaeger Machine Co., Columbus, Ohio

BATTERIES, Storage
Electric Storage Battery Co., Philadelphia

BEARINGS, Ball and Roller
Hyatt Roller Bearing (Div. General Motors Corp.), Harrison, N. J.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Timken Roller Bearing Co., Canton, Ohio

BELTING
Manhattan Rubber Mfg. (Div. of Manhattan-Raybestos, Inc.), Passaic, N. J.

BINS, Storage
Blaw-Knox Co., Pittsburgh, Pa.

BITS, Detachable
Ingersoll-Rand Co., New York
Timken Roller Bearing Co., Canton, Ohio

BLASTING ACCESSORIES
Atlas Powder Co., Wilmington, Del.
DuPont deNemours Co., Inc., E. I., Wilmington, Del.

BLOWERS, Pressure
Roots-Connersville Blower Corp., Connersville, Ind.

BLUE PRINT PAPER
Post Co., Frederick, Chicago

BODIES, Motor Truck
Anthony Company, Inc., Streator, Ill.
Gar Wood Industries, Inc., Detroit, Mich.

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Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., (U. S. Steel Corp. Sub.), Pittsburgh, Pa.
Ryerson & Sons, Inc., Jos. T., Chicago

BOOKS, Engineering & Technical
McGraw-Hill Book Co., Inc., New York

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Edward B. Brittin, Springfield, Ill.

BREAKERS, Rock
Atlantic Steel Co., New York

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Earle Gear & Machine Co., Philadelphia

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American Bridge Co., (U. S. Steel Corp. Sub.), Pittsburgh, Pa.
Belmont Iron Wks., Philadelphia
Bethlehem Steel Co., Bethlehem, Pa.
Fort Pitt Bridge Wks., Pittsburgh, Pa.
Mount Vernon Bridge Co., Mt. Vernon, Ohio
Phoenix Bridge Co., Philadelphia
Pittsburgh-Des Moines Steel Co., Pittsburgh

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Blaw-Knox Co., Pittsburgh, Pa.
Harnischfeger Corp., Milwaukee, Wis.
Hayward Co., New York
Northwest Engineering Co., Chicago
Sauerman Bros., Inc., Chicago
Wellman Engineering Co., Cleveland, Ohio

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Blaw-Knox Co., Pittsburgh, Pa.
Hayward Co., New York
Industrial Brownhoist Corp., Bay City, Mich.
Owen Bucket Co., Cleveland, Ohio
Wellman Engineering Co., Cleveland, Ohio

BUILDING MOVING
Eichleay Engineering Corp., Pittsburgh, Pa.

BUILDINGS, Steel
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Belmont Iron Wks., Philadelphia
Blaw-Knox Co., Pittsburgh, Pa.
Butler Manufacturing Co., Kansas City, Mo.

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Construction Machry. Co., Waterloo, Iowa
Sterling Wheelbarrow Co., Milwaukee, Wis.

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Tarrant Manufacturing Co., Saratoga Springs, N. Y.

CATCHBASINS, Iron
Armco Culvert Manufacturers Assn., Middletown, Ohio

CEMENT
Lehigh Portland Cement Co., Allentown, Pa.
Lone Star Cement Corp., New York
Portland Cement Association, Chicago
Robinson Clay Product Co., New York

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Gunite Concrete & Construction Co., Kansas City, Mo.

CHIMNEYS
Kellogg Co., Inc., M. W., New York

COMPENSATION INSURANCE
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COMPRESSORS, Air
Gardner-Denver Co., Quincy, Ill.
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Ingersoll-Rand Co., New York
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Dempster Brothers, Inc., Knoxville, Tenn.

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Raymond Concrete Pile Co., New York
Snare Corp., Frederick, New York
Spencer, White & Prentis, Inc., New York

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COPING, Wall
Robinson Clay Product Co., Akron, Ohio

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Austin-Western Road Machy. Co., Aurora, Ill.
Bay City Shovels, Inc., Bay City, Mich.
Browning Crane & Shovel Co., Cleveland, Ohio
Buckeye Traction Ditcher Co., Findlay, Ohio
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American Hoist & Derrick Co., St. Paul, Minn.
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Link-Belt Co., Chicago, Ill.
Ohio Locomotive Crane Co., Bucyrus, Ohio

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Gar Wood Industries, Inc., Detroit, Mich.
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Michigan Power Shovel Co., Benton Harbor, Mich.
Thew Shovel Co., Lorain, Ohio
Universal Power Shovel Co., Milwaukee

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W. A. Riddell Corp., Bucyrus, Ohio

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Toncan Culvert Mfrs. Assn., Cleveland
U. S. Pipe & Foundry Co., Burlington, N. J.

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Kinnear Mfg. Co., Columbus, Ohio

DOORS, Steel
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Kinnear Mfg. Co., Columbus, Ohio

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(See Cranes & Shovels)
(See Excavators, Dragline)

DRAIN PIPE
Johns-Manville Corp., New York
Walker Cement Products Co., Little Ferry, N. J.
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Morris Machine Works, Baldwinsville, N. Y.

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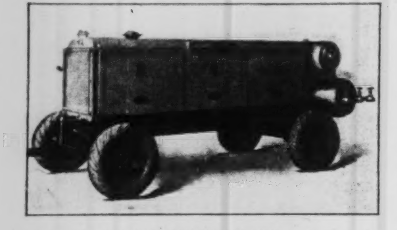

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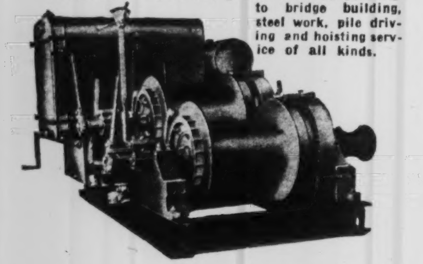

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Phillips Drill Co., Chicago

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DuPont deNemours Co., Inc., E. I., Wilmington, Del.

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Douglas Fir Plywood Ass'n., Tacoma, Wash.

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Macwhyte Co., Kenosha, Wis.
National Lumber & Creosoting Co., Texarkana, Ark. See Koppers Co.
Wood Preserving Corp., Pittsburgh, Pa. See Koppers Co.

HAMMERS, Gasoline
Barco Manufacturing Co., Chicago

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Jaeger Machine Co., Columbus, Ohio
Lidgerwood Mfg. Co., Elizabeth, N. J.
McKiernan-Terry Corp., New York
Novo Engine Co., Lansing, Mich.
O. K. Clutch & Machinery Co., Columbia, Pa.
Sterling Machinery Corp., Kansas City, Mo.

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Beebe Bros., Seattle, Wash.
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Sterling Machinery Corp., Kansas City, Mo.

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Johns-Manville Corp., New York
Keasbey & Mattison Co., Ambler, Pa.

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Johns-Manville Corp., New York
Koppers Co., Koppers Bldg., Pittsburgh, Pa. (Tar & Chemical Div.)

JOINTS, Pipe (See Pipe Joints)

JUTE, Dry
Robinson Clay Product Co., Akron, Ohio

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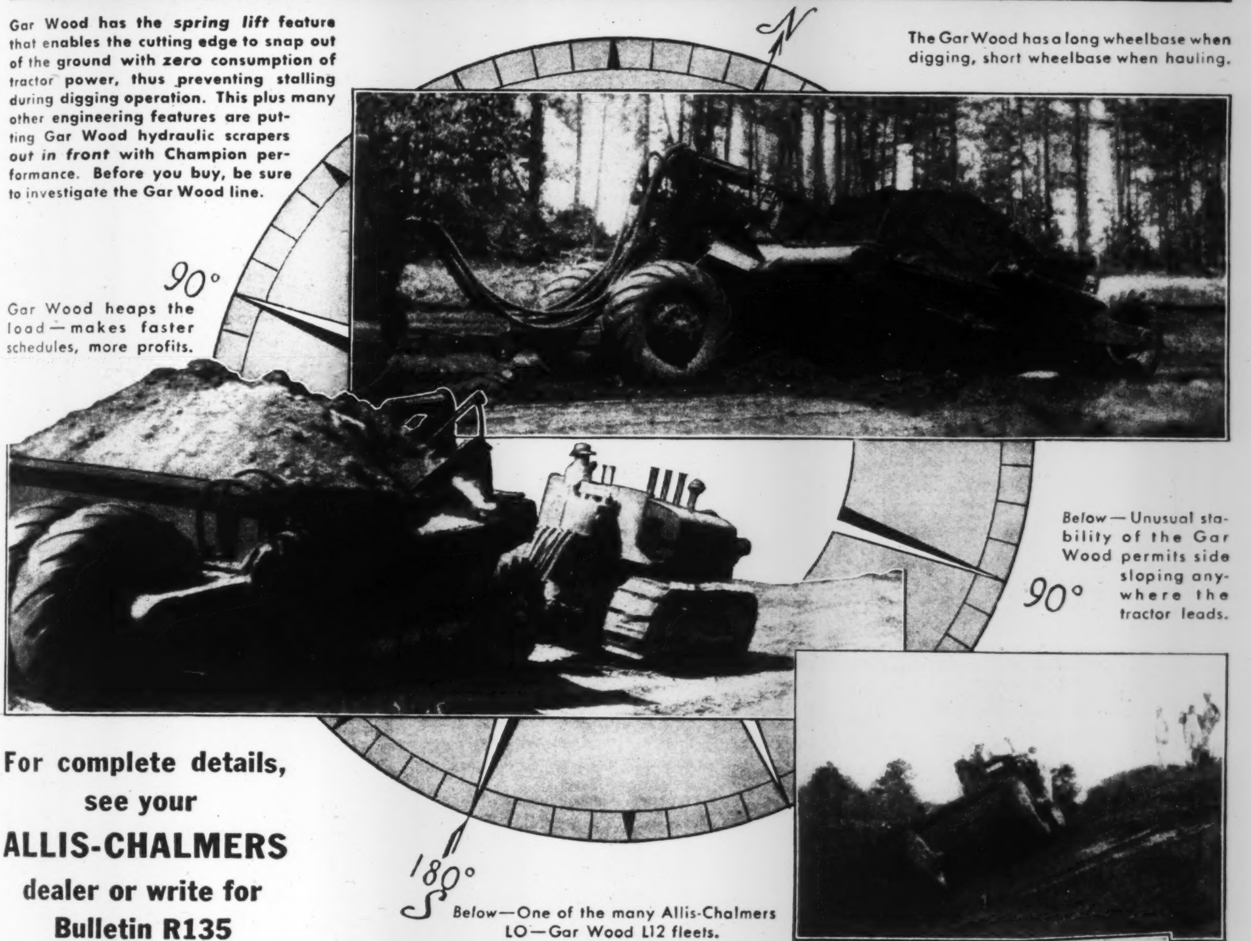

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Jaeger Machine Co., Columbus, Ohio
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Chain Belt Co., Milwaukee, Wis.
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McKiernan-Terry Corp., New York
Union Iron Works, Inc., Elizabeth, N. J.
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National Lumber & Creosoting Co., Texarkana, Ark. See Koppers Co.
Wood Preserving Corp., Pittsburgh, Pa. See Koppers Co.

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Carnegie-Illinois Steel Corp., (U. S. Steel Corp. (Sub.), Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.

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Johns-Manville Corp., New York

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Youngstown Steel & Tube Co., Youngs

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Youngstown Sheet & Tube Co., Youn

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Douglas Fir Plywood Ass'n., Tacoma,

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Construction Machinery Co., Waterloo,
Erie Pump & Engine Works, Medina,
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Gardner-Denver Co., Quincy, Ill.
Gorman-Rupp Co., Mansfield, O.
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Roots-Connersville Blower Co., Conn Ind.
Sterling Machinery Corp., Kansas City
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Roebling's Sons Co., John A., Trenton, N. J.

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Construction Machinery Co., Waterloo, Iowa
Sterling Machinery Co., Kansas City, Mo.

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Riddell Corp., W. A., Bucyrus, Ohio

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Adams Co., J. D., Indianapolis, Ind.
Austin-Western Road Machy. Co., Aurora, Ill.
Gar Wood Industries, Inc., Detroit, Mich.
LeTourneau, Inc., R. G., Peoria, Ill.

SCRAPERS, Slackline
Sauerman Bros., Inc., Chicago

SCRAPERS, SCARIFIERS, PLOWS, etc.
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Baker Mfg. Co., Springfield, Ill.
Gar Wood Industries, Inc., Detroit
LaPlant-Choate Mfg. Co., Cedar Rapids, Iowa
LeTourneau, Inc., R. G., Peoria, Ill.
W. A. Riddell Corp., Bucyrus, Ohio

SCREENS, Aggregate
Gruendler Crusher & Pulverizer Co., St. Louis, Mo.
Pioneer Engineering Works, Inc., Minneapolis, Minn.

SEGMENT BLOCKS
Robinson Clay Product Co., Akron, Ohio

SEWAGE DISPOSAL APPARATUS
Chain Belt Co., Milwaukee, Wis.
Link-Belt Co., Chicago, Ill.
Pittsburgh Equitable Meter Co., Pittsburgh, Pa.

SEWER PIPE, Vitrified Clay
Robinson Clay Product Co., Akron, Ohio

SHARPENERS, Drill Steel
Ingersoll-Rand Co., New York

SHEAVES
American Hoist & Derrick Co., St. Paul, Minn.
Dobbie Fdry. & Mach. Co., Niagara Falls, N.Y.

SHEETS, Iron and Steel
Bethlehem Steel Co., Bethlehem, Pa.
Byers Co., A. M., Pittsburgh, Pa.
Carnegie-Illinois Steel Corp., (U. S. Steel Corp. Sub.), Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS, Non-ferrous
Johns-Manville Corp., New York
Keasbey & Mattison Co., Ambler, Pa.

SHIELDS, Tunnel
Alco Products, Inc., Div. American Locomotive Works, New York
Mayo, Robt. S., Lancaster, Pa.
Union Iron Works, Inc., Elizabeth, N. J.

SHORING
Eichleay Engineering Corp., Pittsburgh, Pa.

SHOVELS, Power
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Austin-Western Road Machy. Co., Aurora, Ill.
Bay City Shovels, Inc., Bay City, Mich.
Browning Crane & Shovel Co., Cleveland
Buckeye Traction Ditcher Co., Findlay, Ohio
Harnischfeger Corp., Milwaukee
Industrial Brownhoist Corp., Bay City, Mich.
Koehring Co., Milwaukee
Link-Belt Co., Chicago, Ill.
Michigan Power Shovel Co., Benton Harbor, Mich.
Northwest Engineering Co., Chicago
Thew Shovel Co., Lorain, Ohio
Universal Power Shovel Co., Milwaukee

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Baker Mfg. Co., Springfield, Ill.
Gar Wood Industries, Inc., Detroit
LaPlant-Choate Mfg. Co., Cedar Rapids, Iowa
LeTourneau, Inc., R. G., Peoria, Ill.

SPRAYERS, Asphalt Emulsion
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SPREADERS, Bituminous
Austin-Western Rd. Machry. Co., Aurora, Ill.
Barber-Greene Co., Aurora, Ill.
Jaeger Machine Co., Columbus, Ohio

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STEEL PLATE CONSTRUCTION
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Koppers Co., Fort Wayne, Ind. (Western Gas Div.)
Koppers Co., Baltimore, Md. (Bartlett Hayward Div.)
Lancaster Iron Works, Inc., Lancaster, Pa.

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Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., (U. S. Steel Corp. Sub.), Pittsburgh, Pa.
Fort Pitt Bridge Wks., Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Mount Vernon Bridge Co., Mount Vernon, Ohio
Phoenix Bridge Co., Philadelphia
Pittsburgh-Des Moines Steel Co., Pittsburgh
Ryerson & Son, Inc., Jos. T., Chicago, Ill.

SUBGRADERS
Buckeye Traction Ditcher Co., Findlay, Ohio
Jaeger Machine Co., Columbus, Ohio

SWEEPERS, Street
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SWITCHBOARDS
Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

TAMPERS
Cleveland Rock Drill Co., The, Cleveland
Electric Tamper & Equip. Co., Ludington, Mich.
Ingersoll-Rand Co., New York

TANKS, Steel
Alco Products, Inc., Div. of American Locomotive Works, New York, N. Y.
American Bridge Co., (U. S. Steel Corp. Sub.), Pittsburgh, Pa.
Chicago Bridge & Iron Wks., Chicago
Cole Mfg. Co., R. D., Newnan, Ga.
Koppers Co., Fort Wayne, Ind. (Western Gas Div.)
Koppers Co., Baltimore, Md. (Bartlett Hayward Div.)
Lancaster Iron Works, Inc., Lancaster, Pa.
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.

TAPES, Steel & Metallic
Keuffel & Esser Co., Hoboken, N. J.

TAR
Koppers Co., Koppers Bldg., Pittsburgh, Pa. (Tar & Chemical Div.)

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TILE, Drain
Robinson Clay Product Co., Akron, Ohio

TIMBER, Treated
American Creosoting Co., Chicago, Ill.
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Wood Preserving Corp., Pittsburgh, Pa. See Koppers Co.

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Gardner-Denver Co., Quincy, Ill.
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Kelow Steel Flooring Co., Jersey City, N. J.

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General Electric Co., Schenectady, N. Y.

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Spencer, White & Prentis, Inc., New York
Underpinning & Foundation Co., Inc., New York

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Chapman Valve Mfg. Co., Indian Orchard, Mass.
Pittsburgh Equitable Meter Co., Pittsburgh

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Electric Tamper & Equip. Co., Ludington, Mich.
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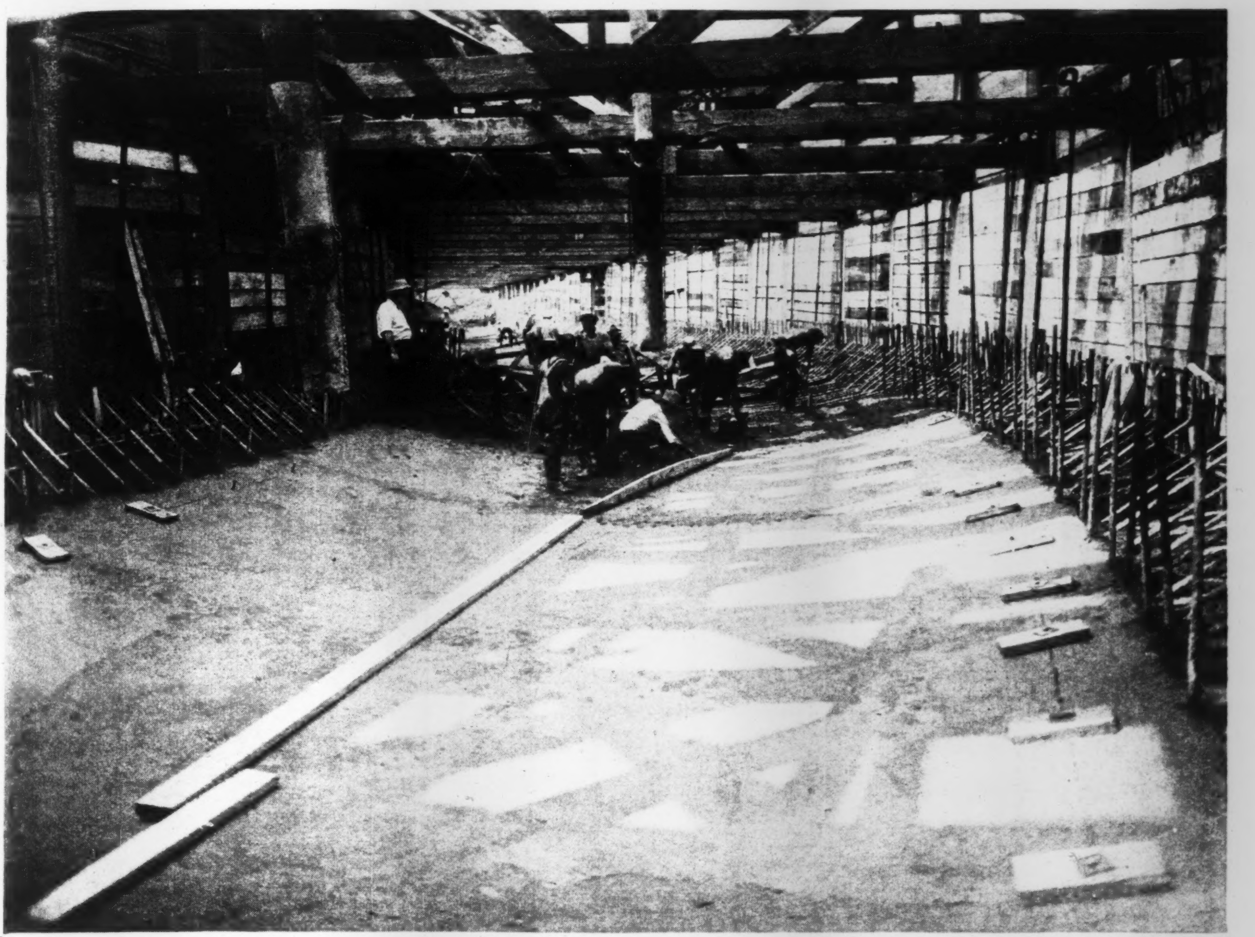
Koppers Co., Koppers Bldg., Pittsburgh, Pa. (Tar & Chemical Div.)

WRENCHES, Reversible Ratchet
Lowell Wrench Co., Worcester, Mass.



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DIRECTORY OF ENGINEERS 117-118

NEW in Principle and Performance

The Owen COMBINATION Orange Peel GRAPPLE and BUCKET

This unit embodies an entirely new mechanical principle in the independent action of each jaw. The jaw meeting the least resistance penetrates deeply into the material and anchors, to be likewise followed by the other jaws. This results in greater efficiency and more profitable operation when used as a rock grapple or an orange peel bucket.

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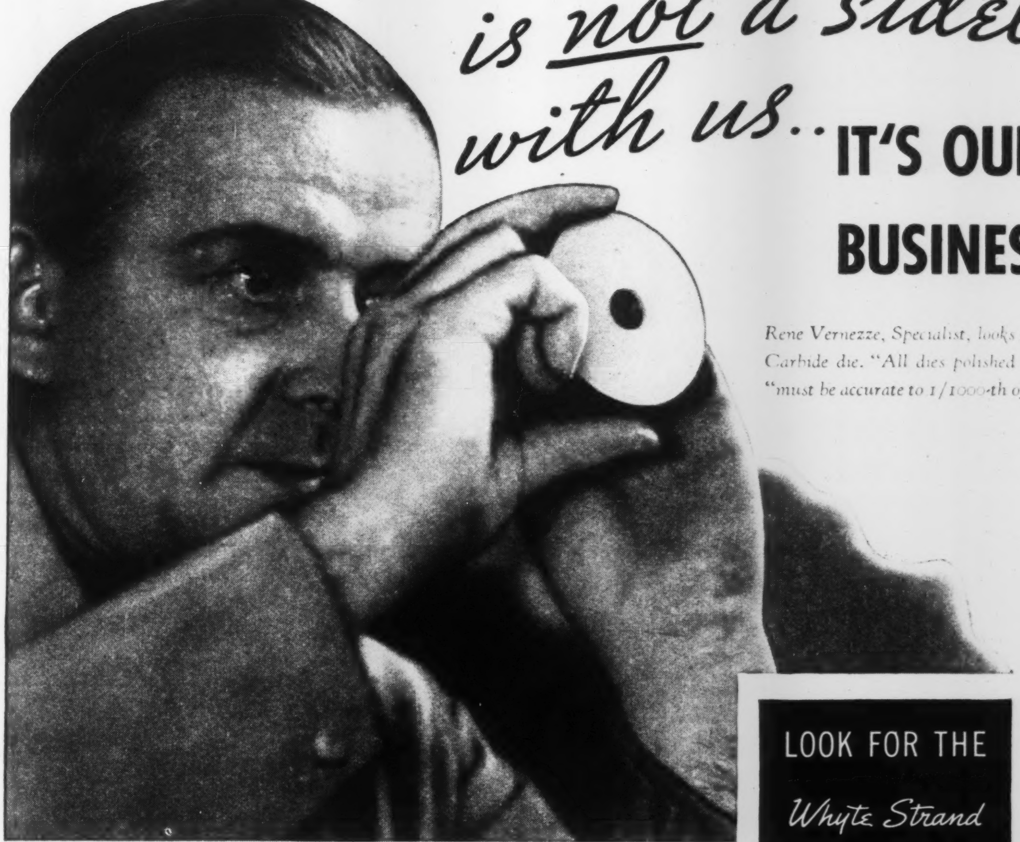

Rene Vernezze, Specialist, looks critically at a Tungsten-Carbide die. "All dies polished at Macwhyte," he says, "must be accurate to 1/1000-th of an inch."

The Macwhyte Company has stuck to one job—specializing in the manufacture of high quality wire and wire rope.

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This same care and accuracy is characteristic of all Macwhyte operations, from laboratory research to finished product. That's why when you buy Macwhyte Whyte Strand, you can expect *better* wire rope service and *longer* wire rope life.

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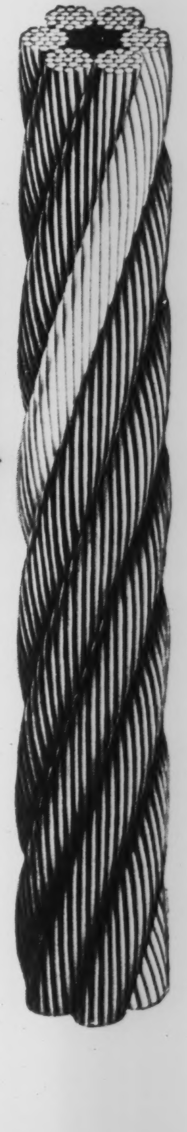
BECAUSE IT'S MADE
BY SPECIALISTS**



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Manufacturers of wire rope and
braided wire rope slings.

Distributors and stock throughout
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NO. 373

MACWHYTE
Whyte Strand - PRE formed

THE WIRE ROPE WITH THE INTERNAL LUBRICATION

Insurance that gives you
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Insurance Is a Main Item in Costs — American Mutual Insurance Is an Opportunity to Cut Those Costs.

What you pay for insurance is a large part of your cost of doing the job. In some cases premium expenses on workmen's compensation alone may amount to as much as 25% of payroll. Therefore, the dividend of 20% that has always been paid to contractors insuring with American Mutual has provided a safe means of reducing bids.

This cost saving is made possible in several ways. First, American Mutual selects safety-minded contractors only; this helps keep our accident losses low. Second, American Mutual sells direct to contractors through salaried representatives; this reduces our selling costs and further increases the earnings in which you share.

Two Other Opportunities to Cut Costs

You also save through two additional services to policyholders—safety engineering and medical rehabilitation.

Our safety specialists work with you to reduce hazards threatening your men, property, and public. In many cases, accident records are improved to the extent that premium rates can be reduced — to say nothing of the great saving you make in elimination of uninsurable production time and material losses.

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American Mutual's record of consecutive annual dividend payments has reached 51 years — longer than any other liability insurance company. Cash dividends to policyholders total over $59,000,000.

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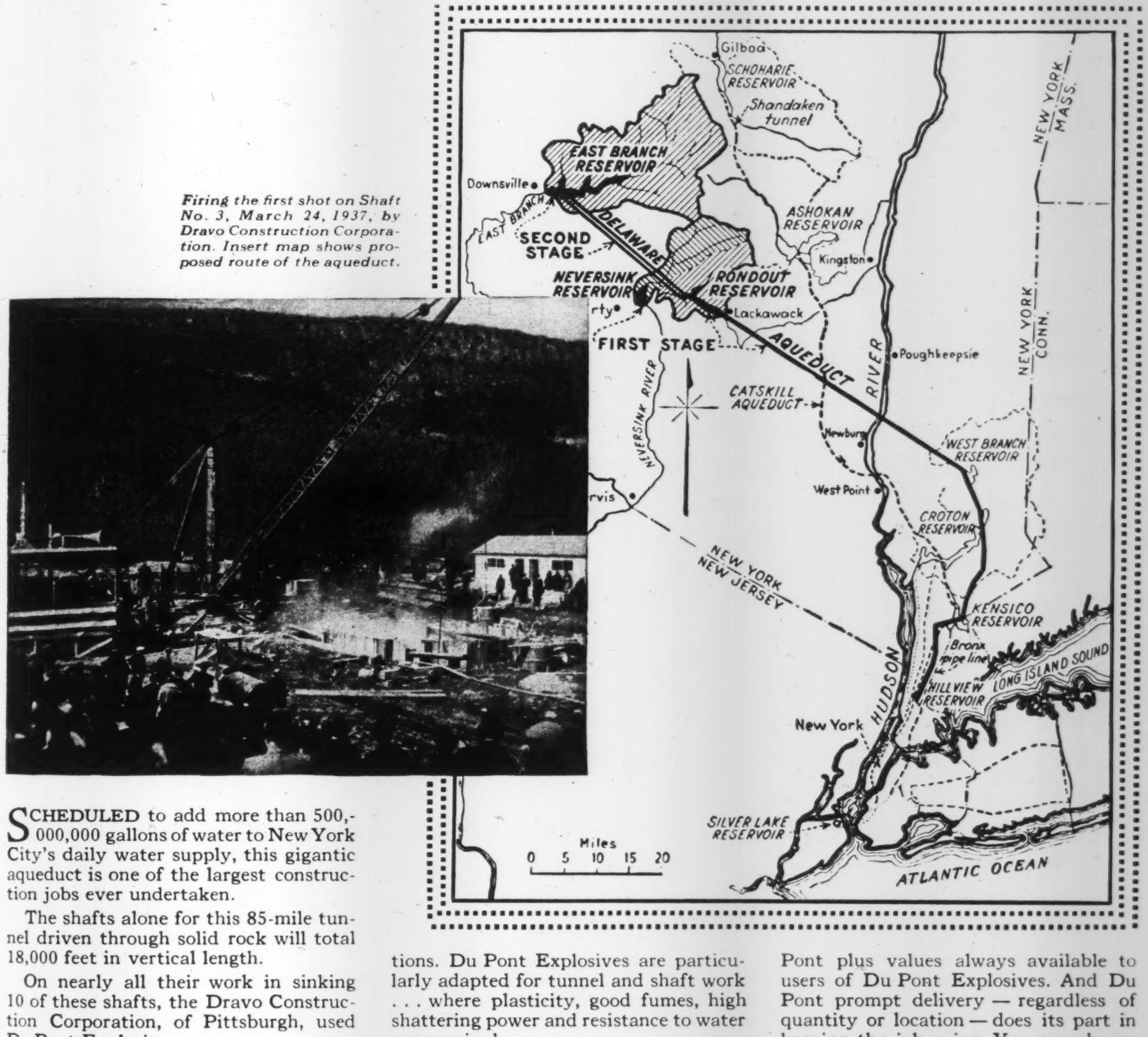
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ATLANTIC OCEAN

Firing the first shot on Shaft No. 3, March 24, 1937, by Dravo Construction Corporation. Insert map shows proposed route of the aqueduct.

SCHEDULED to add more than 500,000,000 gallons of water to New York City's daily water supply, this gigantic aqueduct is one of the largest construction jobs ever undertaken.

The shafts alone for this 85-mile tunnel driven through solid rock will total 18,000 feet in vertical length.

On nearly all their work in sinking 10 of these shafts, the Dravo Construction Corporation, of Pittsburgh, used Du Pont Explosives.

Here is still *another* typical example of how modern contractors rely on Du Pont for *dependable* explosive performance under the most severe conditions. Du Pont Explosives are particularly adapted for tunnel and shaft work . . . where plasticity, good fumes, high shattering power and resistance to water are required.

But Du Pont offers *more* than dependable explosives and blasting accessories. Technical assistance and service on any blasting problem are outstanding Du Pont plus values always available to users of Du Pont Explosives. And Du Pont prompt delivery — regardless of quantity or location — does its part in keeping the job going. You can always get Du Pont Explosives *when, where* and as you want them.

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Explosives Department, Wilmington, Delaware

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Power required is always in direct proportion to the pressure. The ability to deliver against pressures higher than normal is an important safety factor in emergencies.

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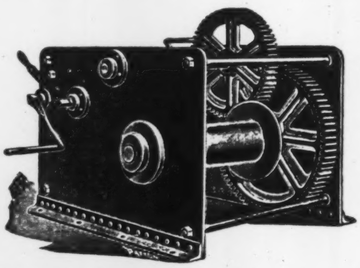
TOMORROW'S ENGINEERING APPROVED BY
YESTERDAY'S EXPERIENCE



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With ease and safety.

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in building scaffolds—horses

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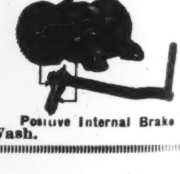

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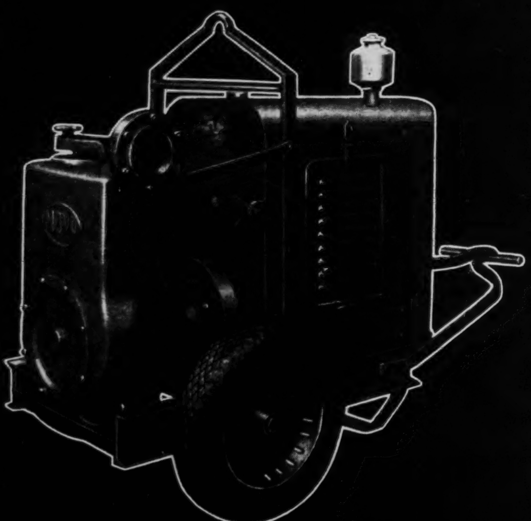

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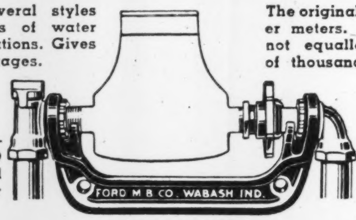
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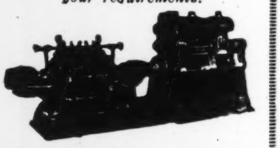

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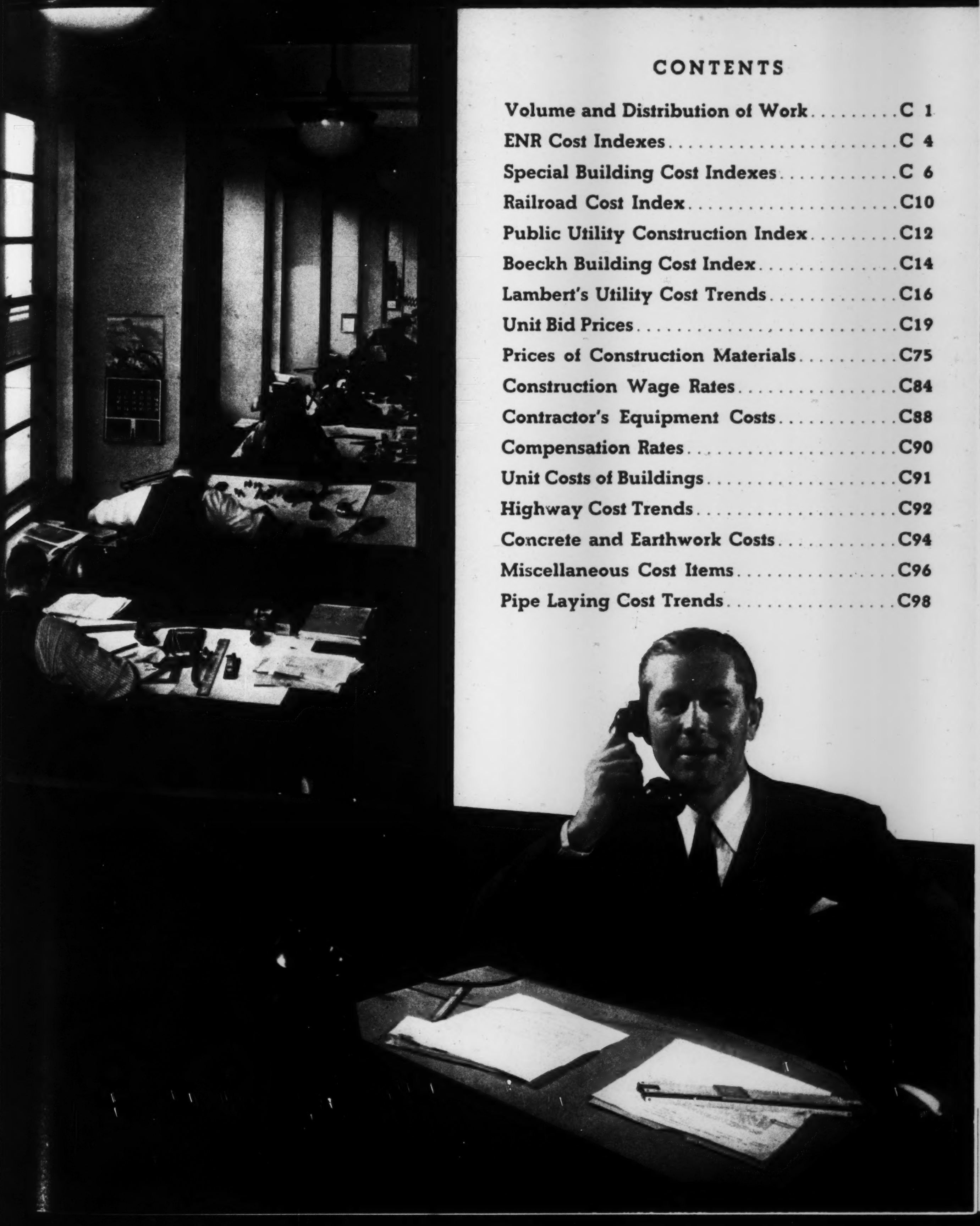
ENGINEERING NEWS-RECORD, JUNE 30, 1938



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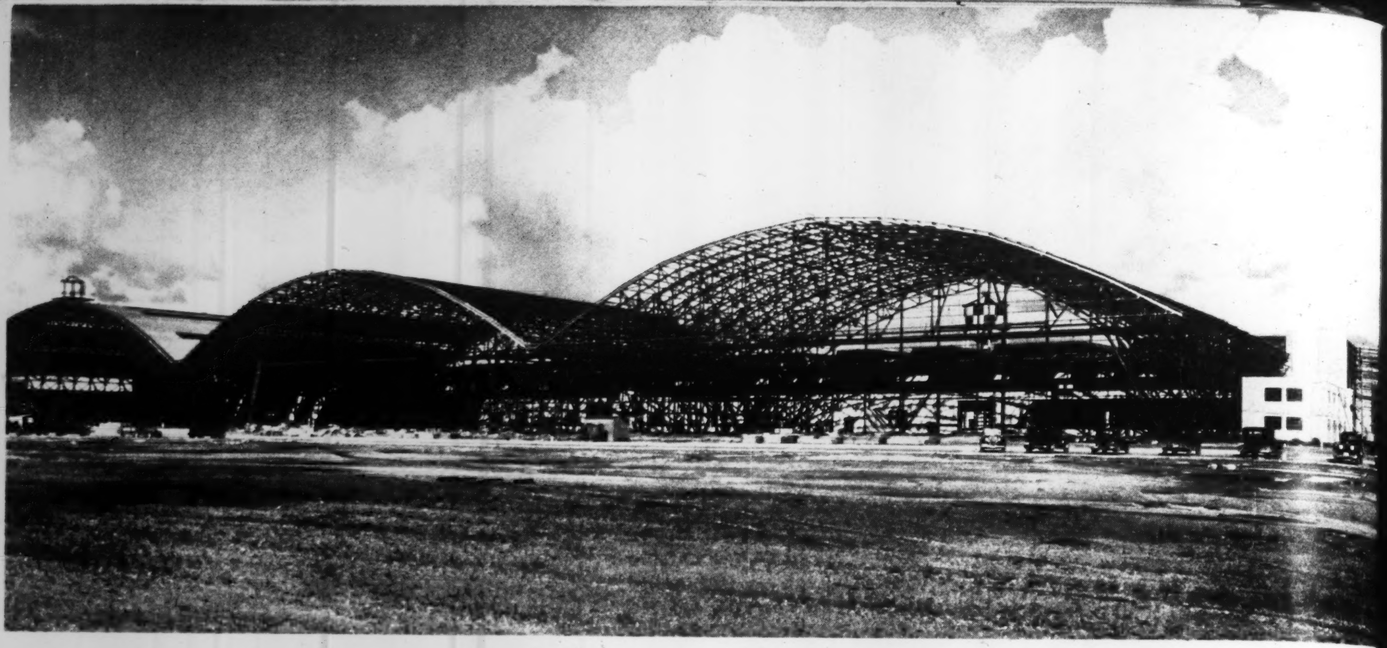

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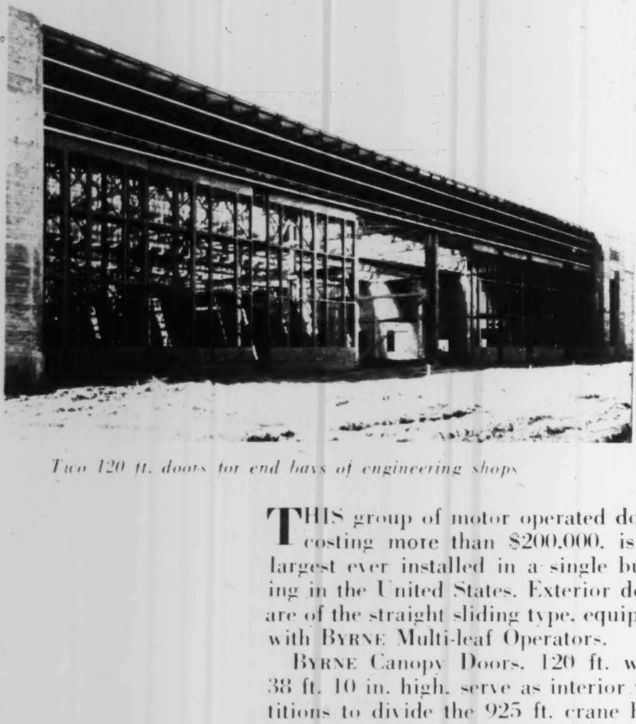

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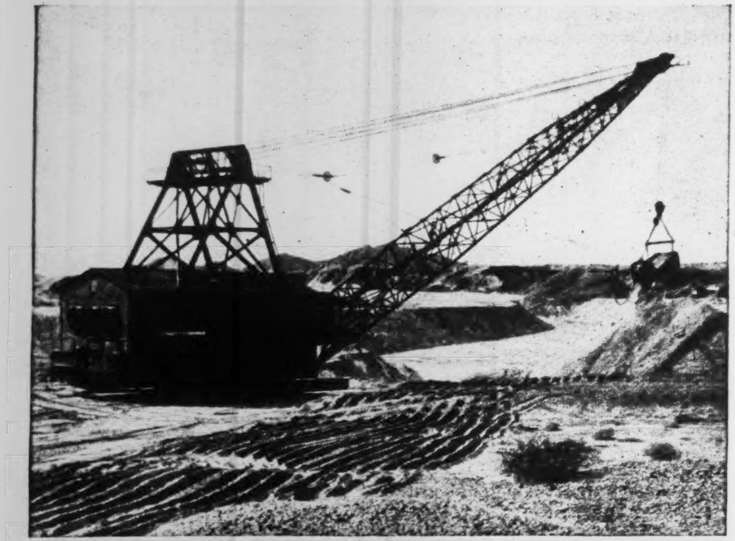

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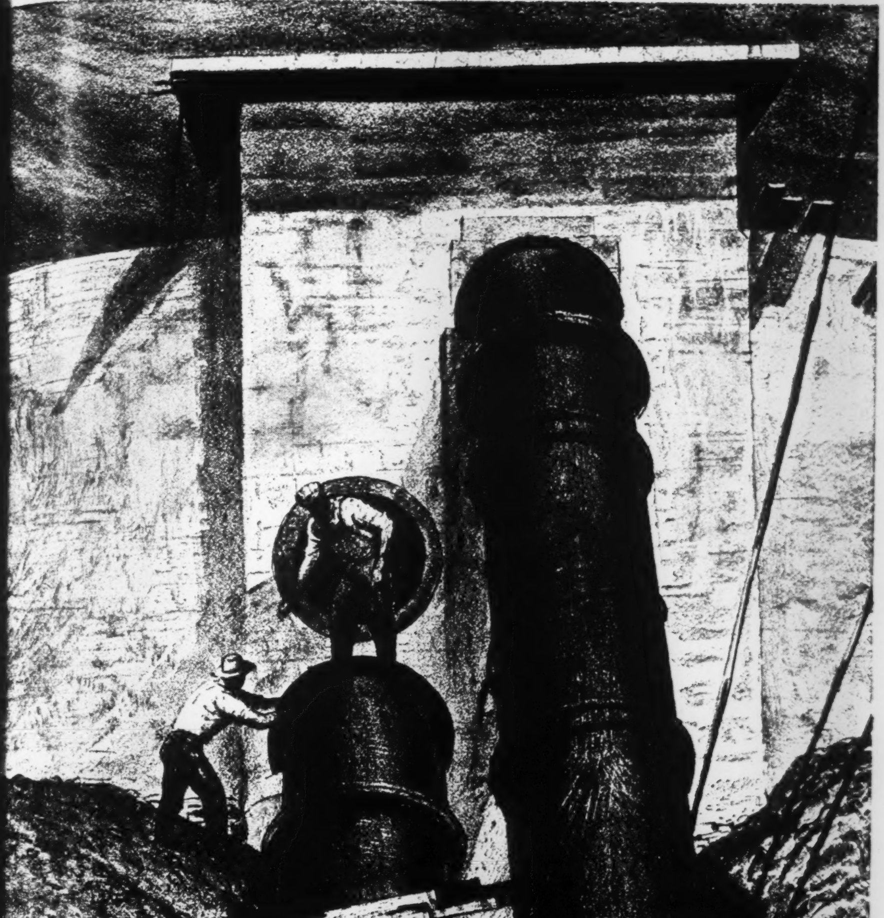

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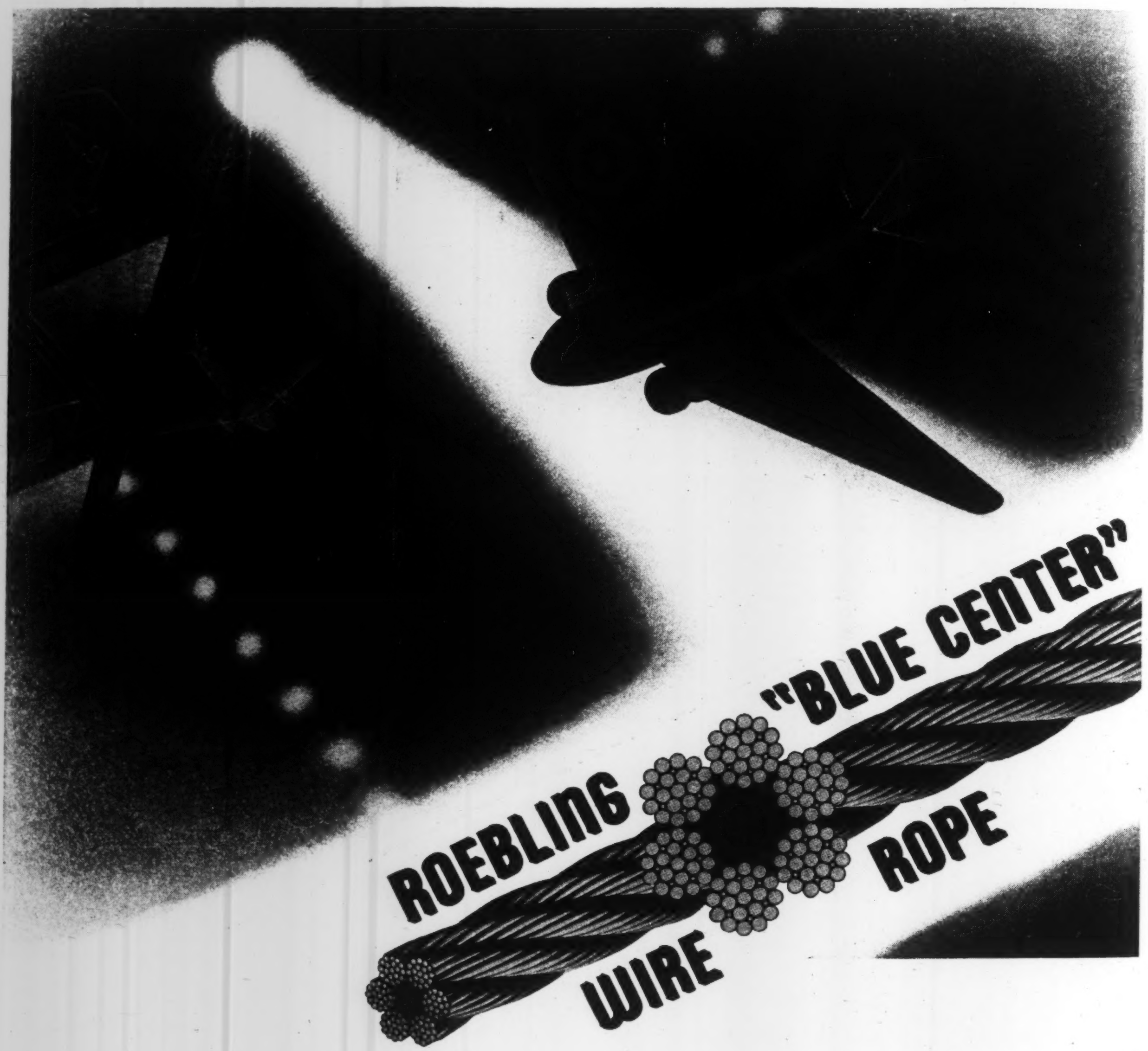

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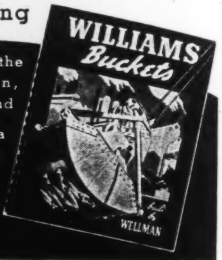
Distributors located in all parts of the country are competent to render valuable field service.

Tell us the condition, and we'll send you FREE, a special bulletin describing the specific Williams Bucket best fitted to the job.



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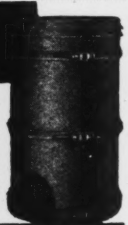

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Costs Go Down When INTERNATIONALS Take Over

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International Trucks and Tractors get the hard, heavy jobs because these rugged units ask no odds, no matter how tough the work. They are as much at home in mud or muck, sand or water, as they are where the going is good. Their dependable performance under the most adverse conditions has won the respect and admiration of users everywhere.

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The Pioneer Self-Caulking Jointing Material for Bell and Spigot Water Pipe

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LEADITE and the following tools and equipment for use with LEADITE:

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Description

Leadite is principally used for making joints in cast iron bell and spigot water mains; is shipped in powder form in sacks containing 100 pounds.

Users

Water works superintendents, engineers, contractors, mines, railroads and industrial plants all over the world use Leadite. Thousands of miles of pipe jointed with Leadite are in service.

Method of Use

The joint space is first "yarned" and the Leadite is melted and poured into the joint, but requires no caulking. Leadite melts at approximately 250° F. Lead melts at approximately 620° F.

Comparative Quantities

One hundred pounds of Leadite are equivalent to approximately four hundred pounds of pig lead based on the joints being made the same depth with either material. It will be easy to figure the approximate quantity of Leadite required for any given quantity of pipe by referring to our Reference Table, copy of which we shall gladly send to you upon request.

Comparative Cost

Under normal conditions, the economies effected by the use of Leadite save approximately 50% to 75% over the method which requires caulking, owing to the saving effected in material and labor.

Saving

Because Leadite saves on the items of caulking charges, digging of large bell-holes and reduces cost of trench pumping to a minimum, Leadite eliminates most every superfluous operation in jointing cast iron water mains, thus permitting the work to be completed with the least amount of effort.

Tools

As no caulking is required, fewer tools are needed.

No Caulking

Leadite joints require no caulking because Leadite adheres to the pipe from the yarn or jute out to face of bell, making a watertight bond. However, a Leadite joint may be melted or cut out at any time if desired in making connections, etc.

Durability

Leadite has been tested and used for more than 35 years and experience has proven that Leadite joints improve with age.

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Leadite is used with excellent results under railroad tracks, highways and over and under bridges where severe vibration has demonstrated the value of using Leadite on this class of work.

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Fuel

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No Caulking

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It is these facts that make Barber-Greene pre-eminent in Cost Cutting Material Handling. For full information, phone, wire or write Barber-Greene Company, 422 West Park Avenue, Aurora, Illinois.

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With Atlas Manasite Blasting Caps and Electric Blasting Caps, there is greater safety in handling for the worker with explosives, and far less chance of accident through handling by irresponsible people.

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Joplin, Mo.
Kansas City, Mo.
Knoxville, Tenn.
Los Angeles, Calif.
Memphis, Tenn.
New Orleans, La.
New York, N. Y.
Philadelphia, Pa.
Picher, Okla.
Pittsburg, Kansas
Pittsburgh, Pa.
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ATLAS

EXPLOSIVES

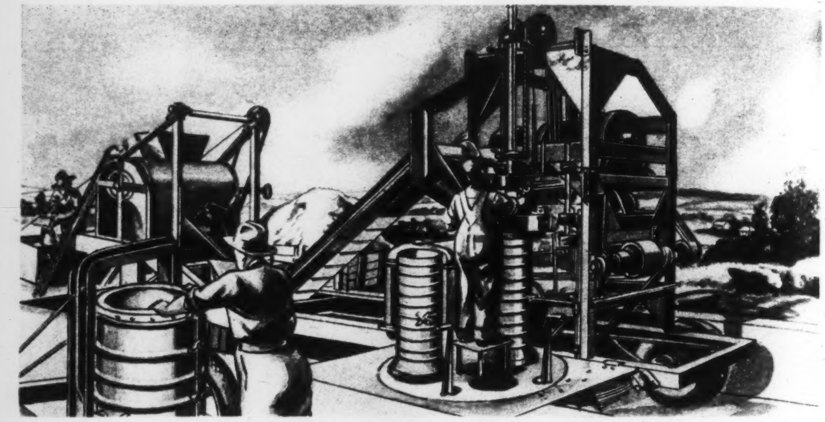
CHEMICALS ATLAS EXPLOSIVES

WEST
and PULLSHOVELS
Built in
a range of
18 sizes, 3/8 cu. yd
capacity and larger
NORTHWEST

NORTHWEST ENGINEERING COMPANY
1727 Steger Building, 28 East Jackson Blvd., Chicago, Illinois

The PORTABLE DUAL PACKER HEAD CONCRETE PIPE MACHINE

CUTS COST OF CONCRETE PIPE



AND HELPS SELL THEM TO CITY OFFICIALS BECAUSE YOU ALONE ASSURE QUALITY PIPE MADE WITH LOCAL LABOR AND MATERIALS

NOT only does the Dual Packer Head Machine enable you to make three pipes in the time required to make one by any other process and assure pipe recognized everywhere as matchless in strength and durability! It also entitles you to lease the Portable Unit and move to the job. A tremendous advantage since you alone can agree to make and lay the pipe with local labor and materials, a necessity on jobs financed by W.P.A. *CITY OFFICIALS* can be assured of quality sanitary or storm sewer pipe in sizes from 4 to 36 inches because our Portable Dual Packer Head Machine is available only to experienced manufacturers. Thus is made possible permanent improvements that leave 80 cents out of every dollar at home.

For details, write us or any of our customers

UNIQUE LEASING POLICY: This Portable unit, available only to customer using the Dual Packer Head machine in his permanent plant, is leased at a fee per ton of pipe produced. The fee is well under transportation costs from his permanent plant, but is in exact relation to the distance away. Thus the inherent advantage or disadvantage of each customer to a particular job is maintained, and never can the Unit be used within 75 miles of a customer's plant. Pipe are made bell-end up under new patents making its portability and operation on a trailer feasible. Options to lease for particular jobs will be granted to customers sending in full information on footage, size and job location. This machine, making 4 to 36 inch and a few hand molds from 42 inch up, completes your line and makes every job a HOME JOB, using local labor and local materials.

EFFECTIVE CURING: No plant is needed. Pipe under the tarpaulin inclosed frames are sprayed at intervals and the exposed pipe more often until nightfall. Two men equipped with garden hose and spray nozzles can assure effective curing through the hottest days and only one is needed through the night.

OUR DOMESTIC CUSTOMERS

CALIFORNIA:
- American Concrete & Steel Pipe Co., Los Angeles.
- Merritt Concrete Pipe Co., San Jose.
- Van Cleve Construction Co., Exeter.

CONNECTICUT:
- Conn. High Test Sand & Gravel Co., New Haven.
- Connecticut Agstone Co., Danbury.

FLORIDA:
- City of Sanford, Sanford.

GEORGIA:
- Universal Concrete Pipe Co., Atlanta.
- Tattnall State Prison, Reidsville.

ILLINOIS:
- Continental Concrete Pipe Corp., Blue Island.
- Nelsen Concrete Culvert Co., Inc., Champaign.
- Nelsen Concrete Culvert Co., Inc., E. St. Louis.

KENTUCKY:
- Kentucky Concrete Pipe Co., Russellville.

LOUISIANA:
- Louisiana Materials Co., Inc., New Orleans.
- Concrete Products Co., New Orleans.

MASSACHUSETTS:
- New England Concrete Pipe Corp., Newton Upper Falls.
- New England Concrete Pipe Corp., Springfield.

MICHIGAN:
- Superior Products Co., Detroit.
- Superior Products Co., Escanaba.
- Lemar Pipe and Tile Co., Saginaw.

MINNESOTA:
- North Star Concrete Pipe Co., Mankato.

MISSOURI:
- Kansas City Concrete Pipe Co., Kansas City.

NEW JERSEY:
- Newark Concrete Pipe Co., Newark.
- Newark Concrete Pipe Co., Dover.

NEW YORK:
- Empire State Concrete Pipe Corp., Flushing.
- New York Concrete Pipe Co., Warsaw.
- Gravel Products Corp., Buffalo.

NORTH CAROLINA:
- Carolina Concrete Pipe Co., Lilesville.

OKLAHOMA:
- Baker Concrete Pipe Co., Bethany.
- Ward Beekman Concrete Pipe Co., Okla. City.
- Thomas Concrete Pipe Co., Ada.

SOUTH CAROLINA:
- Carolina Concrete Pipe Co., Columbia.
- Carolina Concrete Pipe Co., Greenville.
- Wallace Concrete Pipe Co., Columbia.

TENNESSEE:
- Choctaw Culvert & Machinery Co., Memphis.

TEXAS:
- Gifford Hill Pipe Co., Dallas.
- Gulf Concrete Pipe Co., Houston.
- Baass Brothers Co., Victoria.
- Southwestern Concrete Pipe Co., Brownsville.

VIRGINIA:
- Arlington Concrete Pipe Corp., Alexandria.
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WEST VIRGINIA:
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WISCONSIN:
- Consumers Supply Co., Milwaukee.
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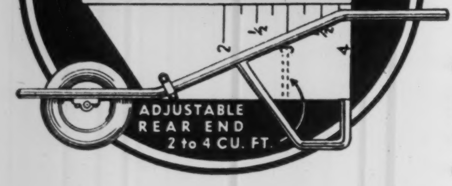
You may not be interested in making pipe but you want control of your concrete mixes made easy with this specially made

VOLUMETRIC BATCHER WHEELBARROW



CONCRETE PIPE & MACHINERY CO.

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have no High Pressure fuel lines—

Injector and fuel pump combined in one unit quickly removable

IN the Murphy Diesel Engine both fuel pump and injector are combined in one unit. The injector is directly driven from overhead camshafts, providing positive mechanical control over fuel injection. There are no high pressure fuel lines to break, leak, or disturb uniform injection. Injectors cannot become airbound, and being in one unit, both pump and injector are removable and interchangeable in a moment's time. Other unusual features result in greater power and economy of operation. Let us send you the new Murphy Bulletin.

MURPHY DIESEL COMPANY, LTD.
5324 W. Burnham Street
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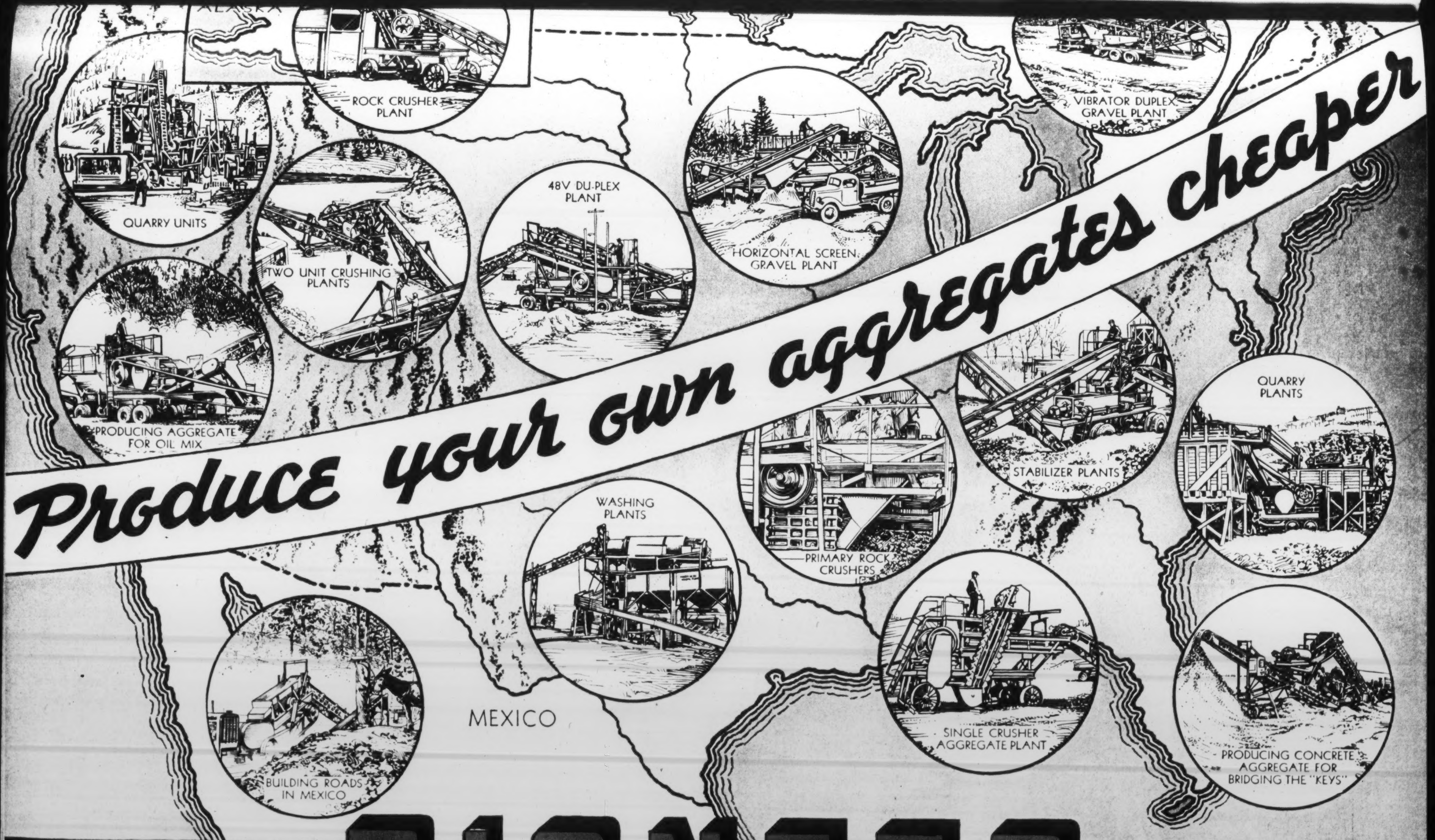
The outstanding advance in DIESEL ENGINES

Ask for a MURPHY DIESEL ENGINE on your Equipment!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PRODUCING CONCRETE AGGREGATE FOR BRIDGING THE "KEYS"

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PIONEER ENGINEERING WORKS · MINNEAPOLIS, MINN.

MANUFACTURERS OF QUARRY
GRAVEL AND MINING EQUIPMENT

NOTHING TAKES THE PLACE OF THE PULLEY

NOTHING TAKES THE PLACE OF CAST IRON PIPE

NOTHING serves the purpose so well as the *pulley*—nothing meets all the requirements of an efficient long-lived underground main so well as *cast iron pipe*. Both have been engineering standbys for centuries. Nothing takes their place.

If you demand *proved* long life and low maintenance cost that result from effective resistance to corrosion—assured safety margins for impact, beam load and crushing stresses—and permanently tight joints—then you will agree that *nothing takes the place of cast iron pipe*. Some materials meet some of these requirements but only cast iron pipe meets them all.

Look for the "Q-Check" registered trade mark.
Cast iron pipe is made in diameters from
$1\frac{1}{4}$ to 84 inches.

CAST IRON

THE STANDARD MATERIAL FOR UNDERGROUND MAINS

Installing 48-inch cast iron pipe, replacing another material, for a water main at Bayonne, N. J.

THE CAST IRON PIPE RESEARCH ASSOCIATION, THOMAS F. WOLFE, RESEARCH ENGINEER, 1015 PEOPLES GAS BUILDING, CHICAGO, ILLINOIS

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HEAVY DUTY

LONG REACH
HIGH LIFT

High lift and long reach cut excavating costs with Koehring Shovels. . . . The Koehring independent and positive crowding action spots the dipper beyond and above the end of the boom or wherever it may be desired. . . . This 5/8 yard Koehring Shovel is operating in a brick plant where high lift and long reach are essential for maximum production.

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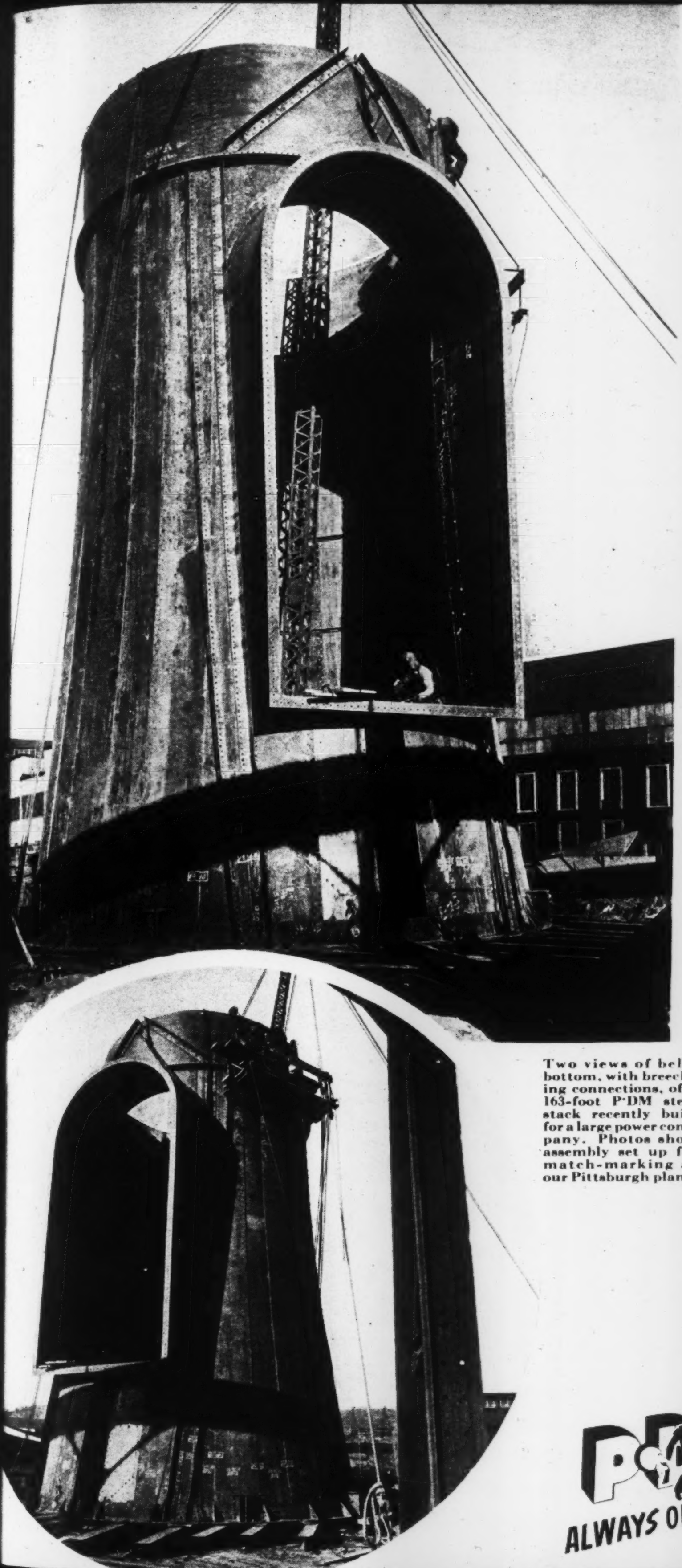
P·DM

HEADQUARTERS FOR STEEL CONSTRUCTION *to meet your* REQUIREMENTS!



Two views of bell-bottom, with breeching connections, of a 163-foot P·DM steel stack recently built for a large power company. Photos show assembly set up for match-marking at our Pittsburgh plant.

Giant steel smokestacks . . . or armored gold vaults; steel industrial buildings, elevated steel tanks, highway bridges; steel swimming pools . . . or wind tunnels for aeronautical research!

These and scores of other standard and special P·DM products all add up to this: that *whatever* your steel construction needs may be, Pittsburgh-Des Moines has the master "know how"—the integrity and careful skill to fulfil them to your complete satisfaction.

Our engineering staff is at your disposal for preliminary surveys and estimates, without obligation. Write for a consultation at your convenience.

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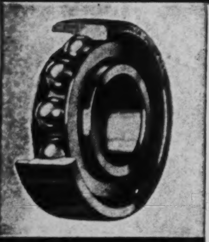
PRECISION BEARINGS



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Single Row Ball Bearing

FOR EVERY LOAD, SPEED AND DUTY

108 DISTINCT SERIES

BALL, ROLLER AND THRUST

OVER 3000 SIZES

1/8" to 21" Bore—Metric and Inch Sizes

Write for the Catalog and Engineering Counsel

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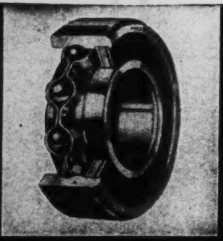
"NORMA-HOFFMANN"

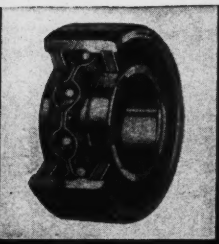
Litro ("CL") Composition Retainer Ball Bearing

Double Row Self-Aligning Ball Bearing

Shielded Type Single Row Ball Bearing

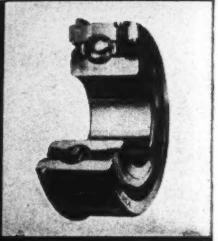


Single Felt Seal Ball Bearing

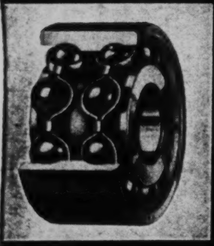


Double Felt Seal Ball Bearing

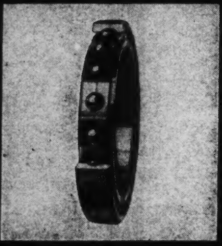
9000 Series (Feltless) Sealed Ball Bearing



Cartridge—Fully Sealed, Refillable Type Ball Bearing



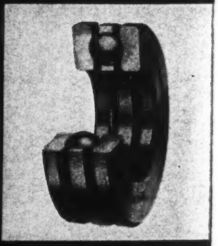
Double Row Ball Bearing



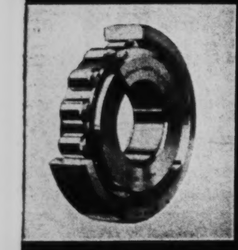
Extra Light Type Ball Bearing

Duplex Type (Two Direction) Angular Contact Ball Bearing

Angular Contact Ball Bearing

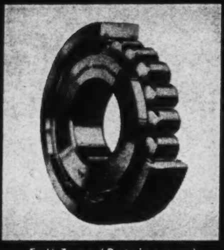


Single Direction Ball Thrust Bearing

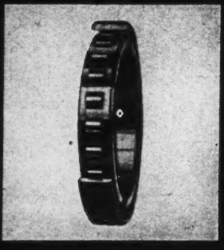


Standard Cylindrical Roller Bearing

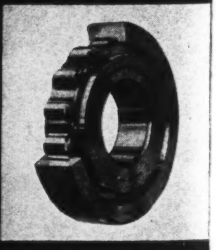
Double Row Self-Aligning Adapter Ball Bearing



Full Type (Retainerless) Cylindrical Roller Bearing



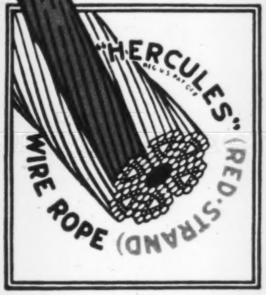
Extra Light Cylindrical Roller Bearing



Two-Lipped Cylindrical Roller Bearing

Balanced—All FIVE

IN "HERCULES" (RED STRAND) WIRE ROPE


"HERCULES" WIRE ROPE (RED-STRAND)

The reasons users get so much extra service out of "HERCULES" (Red-Strand) Wire Rope are because we put so much into it.

Every inch of "HERCULES" (Red-Strand) has these five essential features — strength . . elasticity . . flexibility . . toughness . . durability — all in perfect balance. A superiority of Wire Rope building that we have learned in our eighty-one years of concentrating on *results.*

For better work and real economy, try "HERCULES" (Red-Strand) Wire Rope on your next job.

For maximum efficiency in Preformed Wire Rope, use Preformed "HERCULES". It is available in both Round Strand and Flattened Strand constructions.

Made Only By

A. Leschen & Sons Rope Co.

ESTABLISHED 1857

5909 Kennerly Avenue, St. Louis, Mo.

New York.......90 West Street
Chicago, 810 W. Washington Blvd.
Denver......1554 Wazee Street
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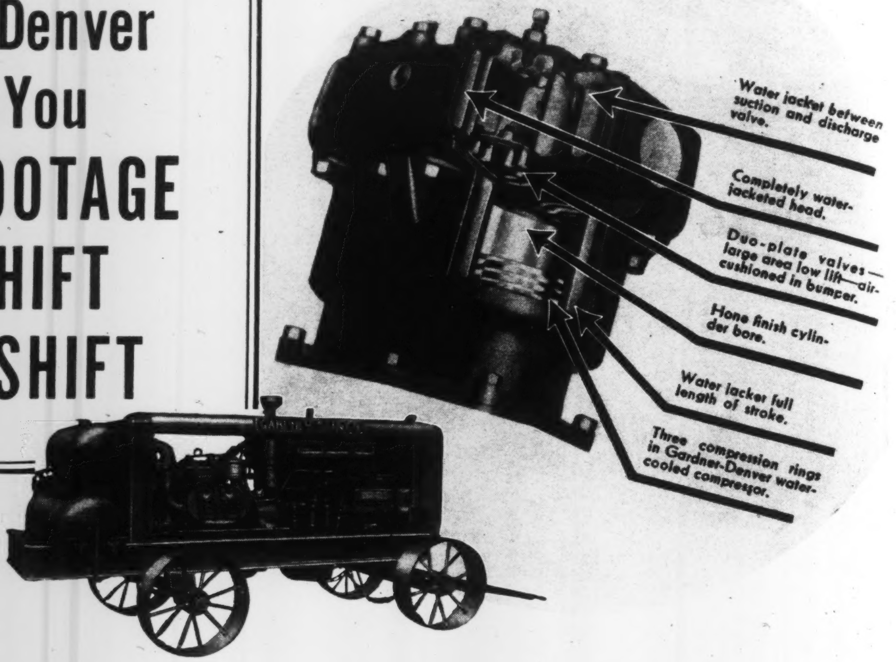
Strength
TO CARRY THE LOAD
Elasticity
TO ABSORB SHOCKS
Flexibility
TO COMBAT BENDING STRESSES
Toughness
TO RESIST WEAR AND TEAR
Durability
FOR LONG LIFE

Four Reasons Why Gardner-Denver Gives You MORE FOOTAGE PER SHIFT EVERY SHIFT


Water jacket between suction and discharge valve.
Completely water-jacketed head.
Duo-plate valves—large area low lift—air-cushioned in bumper.
Hone finish cylinder bore.
Water jacket full length of stroke.
Three compression rings in Gardner-Denver water-cooled compressor.

❶ Two-Stage Because . . .

In two-stage compression the compressed air from the low pressure cylinder passes through the intercooler where the heat of this first stage of compression is removed. Therefore, the high pressure piston does not work against the added pressure of expansion due to this heat. Power is saved and the final temperature is greatly reduced. Lubrication is improved.

❷ Water-Cooled Because . . .

The range of operating temperatures in water-jacketed cylinders is definitely limited, no matter how hot or cold the weather. The jacket water is cooled in the radiator by a fan blast of air at atmospheric temperature and is pump-circulated through the engine and compressor.

In an air-cooled compressor, the cylinders are exposed to the flow of air that comes through the intercooler where it has absorbed the heat from the first stage of compression. This heated air is then blown back to cool the same cylinders in which the heat was generated.

❸ Radial Multi-Cylinder Arrangement Because . . .

Compared to an in-line or "V" arrangement, the radial type permits a shorter, stiffer crankshaft, and the use of roller main bearings. Two low-pressure cylinders of smaller bore for each high pressure cylinder provide better cooling and lighter weight reciprocating parts than in a one-for-one ratio.

❹ Suction Valve Unloader Because . . .

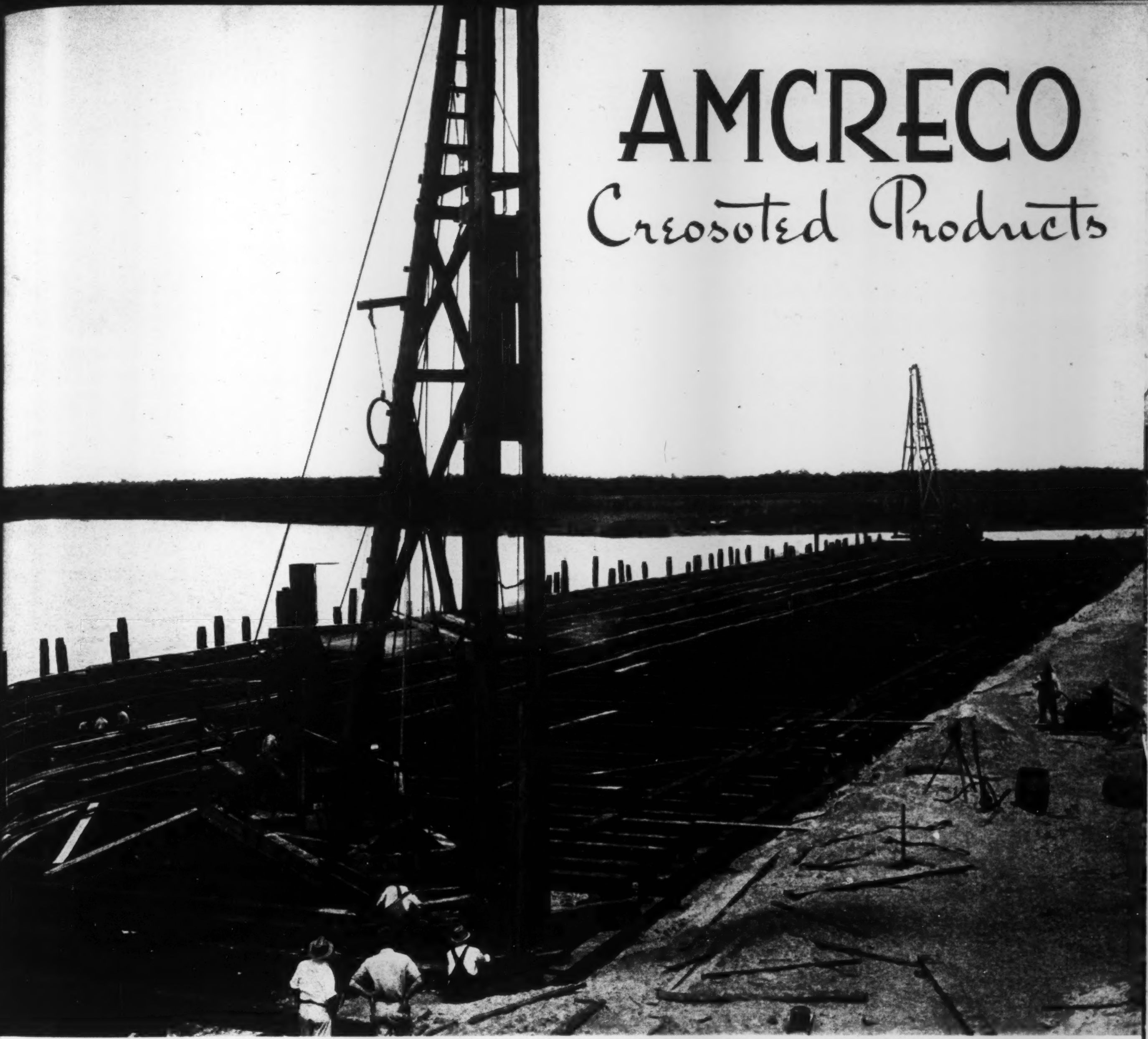
The suction cut-off type of unloader creates a vacuum and has no cooling effect, objections which led to its abandonment on stationary compressors years ago.

In the Gardner-Denver Compressor, the inlet valves of ALL cylinders are held open when the compressor is unloaded, entirely eliminating any oil pumping vacuum while cool air is freely "inhaled and exhaled" with each stroke of the piston. GARDNER-DENVER COMPANY, Quincy, Ill.

Experience on thousands of jobs backs up these facts. Prove them on your own job with Gardner-Denver Two-Stage, Vertical, Water-Cooled Portable Compressors!

GARDNER-DENVER

SINCE 1859



AMCRECO

Creosoted Products

ENGINEERS AND CONTRACTORS have confidence in quality materials. Therefore when AmCreCo full pressure treated piles and timber are used the engineer knows he will have a sound structure with a long life; the contractor will be sure of a smooth working job and will take pride in its finished appearance.

AmCreCo products are low in first and maintenance costs. They give years of service and have a high salvage value.

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INCORPORATED

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INCORPORATED

AMCRECO
LOWRY PROCESS
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ADDRESS INQUIRIES TO CHICAGO, ILL., OR LOUISVILLE, KY.

From Start to

Take Tygart Dam. . . . From earliest construction stages to finishing touches, "Caterpillar" Diesel track-type Tractors have kept faithfully at it on this well-known project.

Take Cajalco Dam—the same all-the-way-through use of "Caterpillar" Diesels there.

Take any large, well-organized contracting operation involving site-clearing, earth-moving, equipment-spotting, material-hauling, clean-up and incidental chores, and you'll find these same machines taking on the tough jobs—and "taking 'em smiling." And economically lighting the way will be "Caterpillar" Diesel Electric Generator Sets.

Take powered equipment—shovels, draglines, ditchers, dredges, pumps, compressors, crushers, drill-rigs—and you'll find "Caterpillar" Diesel Engines making similar records of efficiency and steady going in every quarter of the world.

There must be good reasons. There are. . . . Operating economy, dependable performance, low maintenance, long life unmatched in any other type of power.

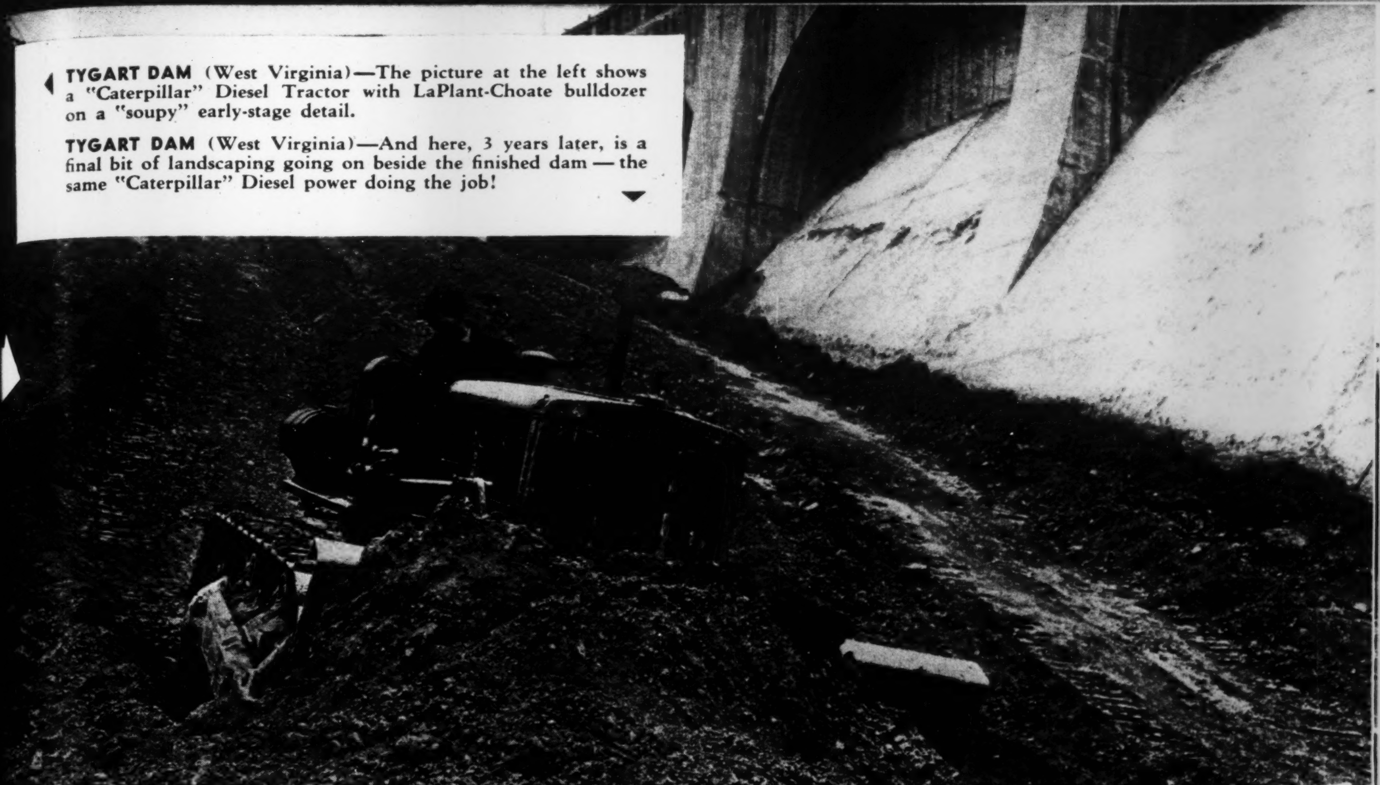
● *Leading equipment and machinery manufacturers power their products with "Caterpillar" Diesel Engines. Ask for "Caterpillar" power and you'll get it.*

CATERPILLAR

REG. U.S. PAT. OFF.

TYGART DAM (West Virginia)—The picture at the left shows a "Caterpillar" Diesel Tractor with LaPlant-Choate bulldozer on a "soupy" early-stage detail.

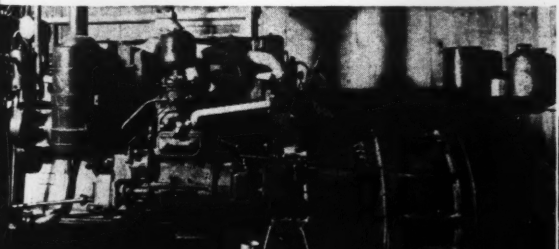
TYGART DAM (West Virginia)—And here, 3 years later, is a final bit of landscaping going on beside the finished dam — the same "Caterpillar" Diesel power doing the job!



Finish

CAJALCO DAM (California)—A "Caterpillar" Diesel Tractor equipped with a LeTourneau bulldozer on preliminary wing-dam earth-fill. The fleet of "Caterpillar" Diesel Tractors in the background is compacting with tampers.

CAJALCO DAM (California)—And now, 3 years later, the "Caterpillar" Diesel equipment does the last job — building a highway across the top of the completed dam.



EUREKA RESERVOIR (California)—A 125-horsepower "Caterpillar" Diesel Engine driving a 60-kw. generator supplying power for gravel plant, lights for plant and camp, and pumps on dam construction for impounding water supply from Mad River. Engine runs 24 hours a day and consumes only 4 gals. of 6c fuel per hour. (A "Caterpillar" Diesel D7 Tractor, with LeTourneau bulldozer, is also used on this job.)

TRACTOR CO.

PEORIA, ILL.

DIESEL ENGINES • TRACK-TYPE TRACTORS • ROAD MACHINERY

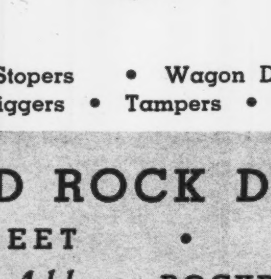
CUT YOUR DRILL REPAIR COSTS

CLEVELAND
ROCK DRILL

DO YOU KNOW that Cleveland Universal Drill Rigs and hand-held drills cost you less for repairs than other makes, and also give you more footage per shift? This can easily be proven by keeping a record of repairs used and footage drilled per shift by each machine you are operating.

Many large users of rock drills carry drilling costs to the third decimal place, providing thus indisputable figures on which to base future drill purchases. If you follow their lead, you can cut your drilling costs by knowing the drills which are giving you the most footage at the least expense.

We have prepared for your use drill repair cost sheets which we will gladly supply to you without charge, and without obligation on your part. How many shall we send?



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LAPLANT-
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CARRIMOR SCRAPER
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RUBBER WHEELED WAGONS
TAMPING ROLLERS

The Use Of LA PLANT-CHOATE Earth-Moving Equipment *Insures Extra Profits!*

YOU can do any earth-moving job more easily . . . more efficiently . . . more profitably with famous LaPlant-Choate equipment because positive finger-tip hydraulic control, ease of operation and scientifically correct design assure you of more work at lower cost per yard moved.

Safe, dependable hydraulic control on all LaPlant-Choate Trailbuilders and Bulldozers gives you positive down pressure for digging, absolute locking of the blade in any position, elimination of hurdling over rocks or stumps and assures safe, accurate operation.

The outstanding new "Carrimor" rear dumping scraper is scientifically designed to materially reduce loading resistance, cuts a smooth, level grade, loads larger loads with less power and unloads sticky material with ease. It's equipment you need.

The famous LaPlant-Choate Rubber Wheeled Wagons are very easy to maneuver, have no inside obstructions to cause dumping resistance, carry exceptionally large loads and have many other time-saving, money-saving features.

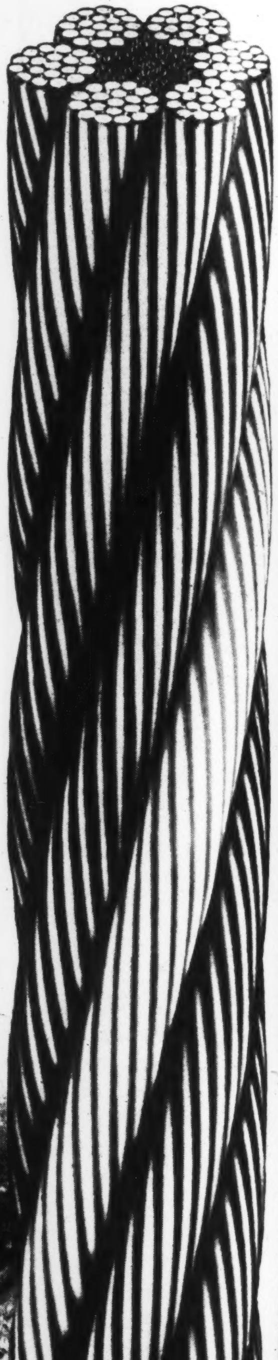
LaPlant-Choate equipment is designed exclusively for use with "Caterpillar" track-type tractors. Get full details today from your "Caterpillar" dealer. Write for free literature on the complete LaPlant-Choate line.

LAPLANT-CHOATE MEANS Lower Costs

**LA PLANT-CHOATE
MANUFACTURING CO. Inc.
CEDAR RAPIDS, IOWA.**

The Tops in Economy

"FLEX-SET" PREFORMED YELLOW STRAND



Cast up the final cost—the REAL cost—of "Flex-Set" Preformed Yellow Strand, and you will find it the most economical of all wire ropes. Use where jobs are toughest. That's what it's made for—hard work!

It's the same super-rope that has been saving contractors money for many years—with this difference: The wires and strands are pre-shaped to the helical form they occupy in the finished rope.

This makes the rope limp, tractable, easy to handle, easy to install—practically pre-broken in; highly resistant to kinking, fatigue, drum crushing. Longer life and greater economy naturally result.

Let "Flex-Set" Preformed Yellow Strand show what it can do for you.

BRODERICK & BASCOM ROPE CO., ST. LOUIS

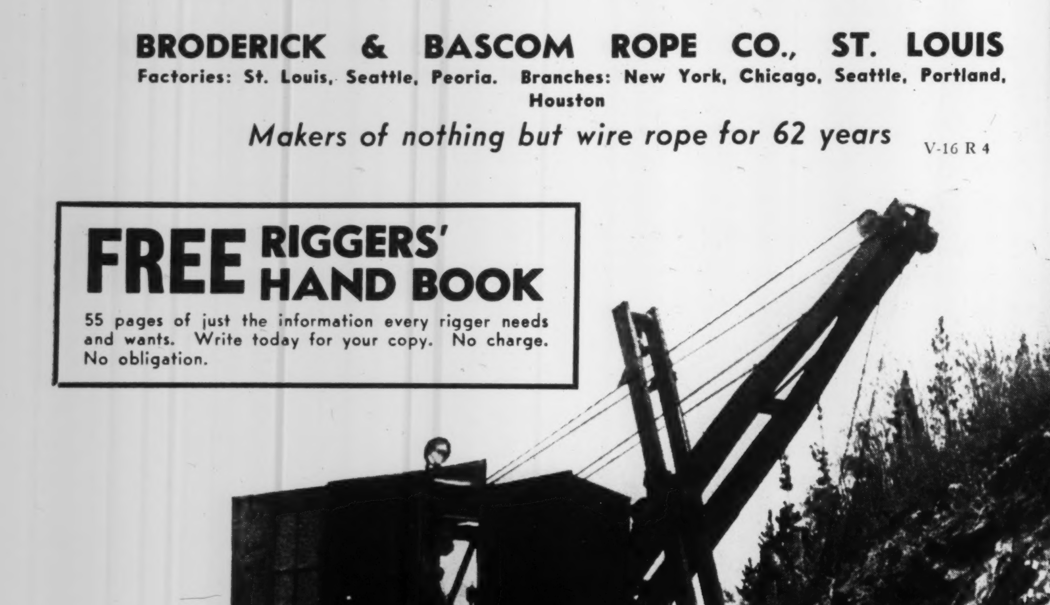
Factories: St. Louis, Seattle, Peoria. Branches: New York, Chicago, Seattle, Portland, Houston

Makers of nothing but wire rope for 62 years

V-16 R 4

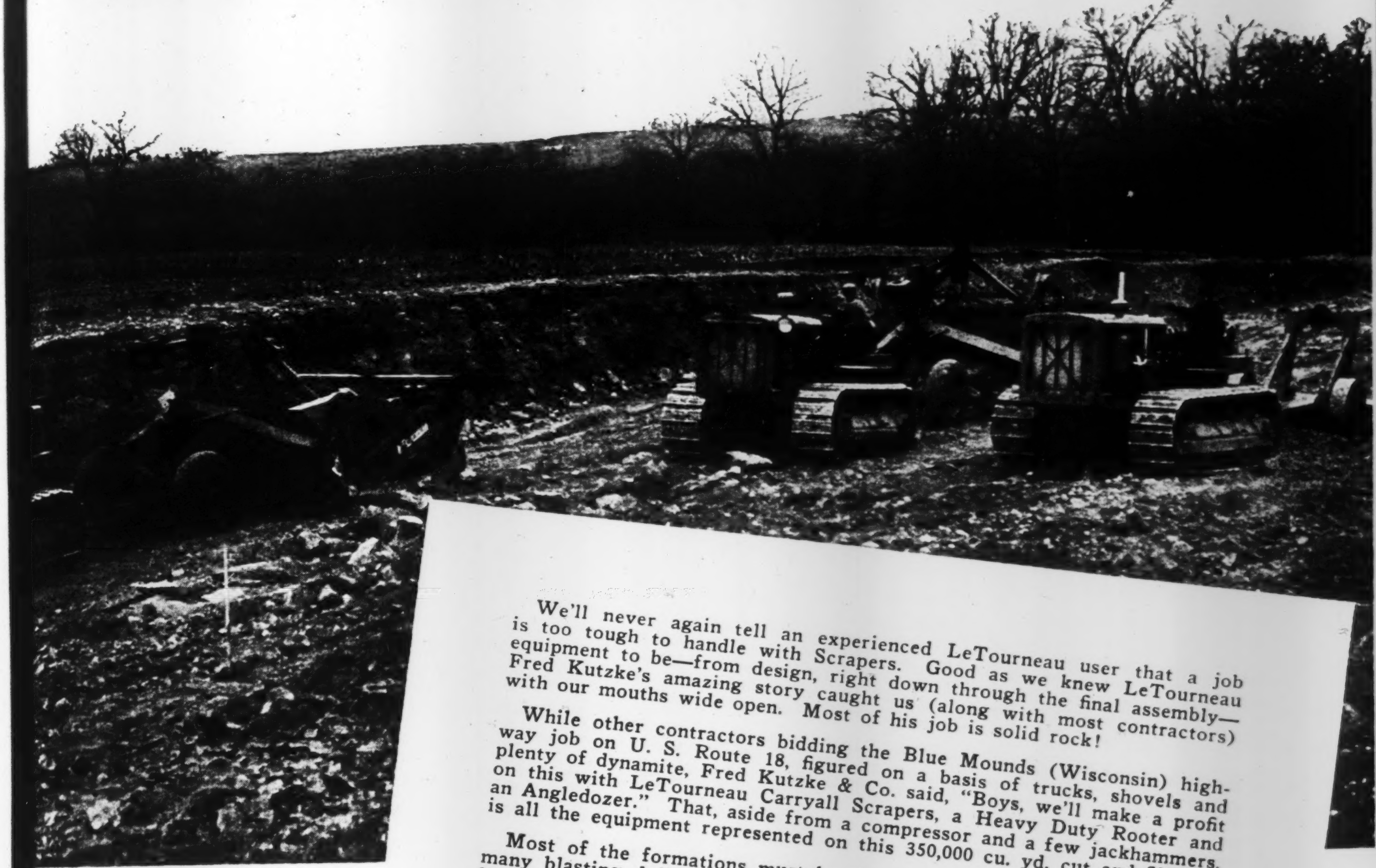
FREE RIGGERS' HAND BOOK

55 pages of just the information every rigger needs and wants. Write today for your copy. No charge. No obligation.



SOLID ROCK

MOVED DIRT CHEAP



We'll never again tell an experienced LeTourneau user that a job is too tough to handle with Scrapers. Good as we knew LeTourneau equipment to be—from design, right down through the final assembly—Fred Kutzke's amazing story caught us (along with most contractors) with our mouths wide open. Most of his job is solid rock!

While other contractors bidding the Blue Mounds (Wisconsin) highway job on U. S. Route 18, figured on a basis of trucks, shovels and plenty of dynamite, Fred Kutzke & Co. said, "Boys, we'll make a profit on this with LeTourneau Carryall Scrapers, a Heavy Duty Rooter and an Angledozer." That, aside from a compressor and a few jackhammers, is all the equipment represented on this 350,000 cu. yd. cut and fill job.

Most of the formations must be shot; even so, the Rooter is saving many blasting dollars by breaking the larger chunks for fast Carryall loading. Some rock is broken entirely with the Rooter, which gives perfect Carryall breakage wherever the teeth will penetrate. As for the Carryall Scrapers, they'll getting good average pay loads with blades that have seen as much as 700 hours service.

Like Fred Kutzke's competitors, some day you'll run into a tough job that you hadn't counted on. Will you be forced to stand by, wondering where your costly methods can be used? Or, will the scrapers you bought after tests in "ordinary" dirt stand the punishment LeTourneau Carryalls have gone through time after time . . . and come out on the profit side? Remember, if your Scrapers will produce profits in rock, you need never worry about profits in dirt . . . sand . . . gravel . . . mud . . . gumbo . . . shale.

Ask your "Caterpillar" dealer *today* for a LeTourneau demonstration . . . if you want to be in the profits *tomorrow*.

LETOURNEAU

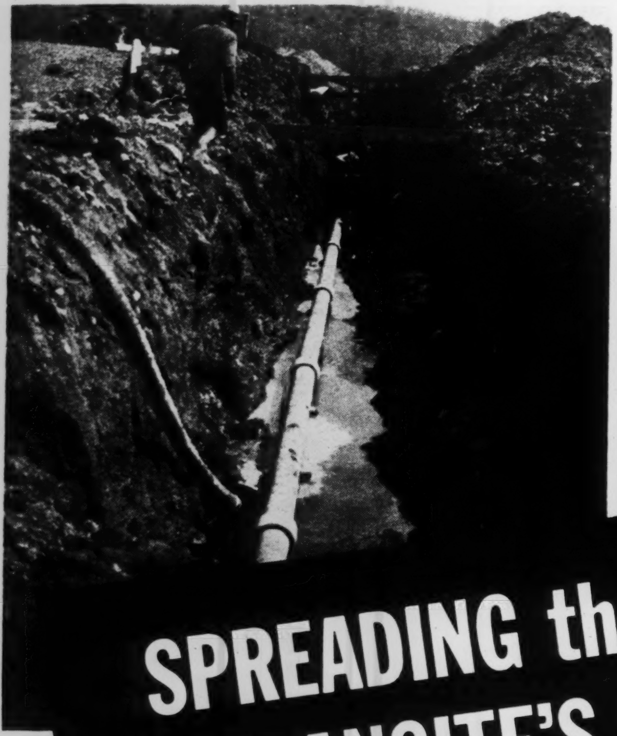
R. G. LeTOURNEAU, INC., • Peoria, Illinois • Stockton, California • Cable Address: "Bobletorno"

Manufacturers of: Angledozers*, Buggies*. Bulldozers, Carryall* Scrapers, Cranes, Drag Scrapers, Power Control Units, Rooters*, Treedozers

*Name Registered U. S. Patent Office.

NEW YORK. Wet trenches do not interfere with Transite Pipe. The Simplex Coupling can be easily assembled by unskilled workmen whether the trench is wet or dry. This coupling is assembled cold . . . eliminates heat-jointing equipment.

KANSAS. Because of its relatively light weight and long length Transite Pipe cuts installation costs. More footage may b carried per truck load to the trench and fewer men are neede for every handling operation.



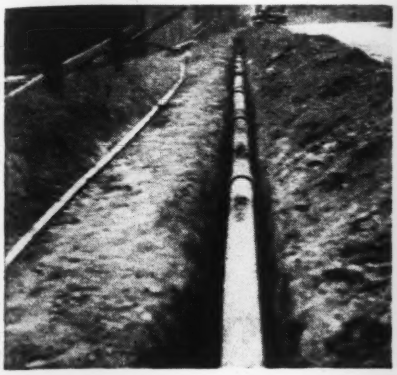
SPREADING the GOOD NEWS of TRANSITE'S MANY SAVINGS

ARIZONA. Because of its asbestos-cement composition, Transite Pipe is unusually resistant to corrosive soil action. This feature is particularly important when pipe must be laid in arid regions.

TEXAS. Transite, being non-metallic, can never tuberculate. Delivery capacity remains high indefinitely . . . pumping costs stay low . . . and costly cleaning to remove tubercules is never necessary.

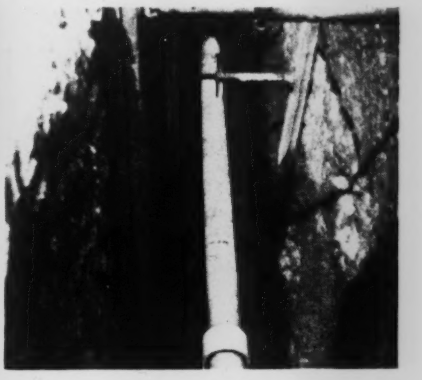
PENNSYLVANIA. Long sweeps can be made easily with straight lengths of Transite Pipe. The flexible Simplex Couplings permit considerable deflection . . . assure bottle-tight joints.

CALIFORNIA. Low installation costs . . . reduced operating expenses . . . minimum maintenance . . . all add up to a three-way cut in water-transportation costs on this Transite Pipe system.



OHIO. One of the many municipal water systems where Transite Pipe is used throughout. Hundreds of American cities are assured sizable reductions in water-carrying costs with this modern pipe.

MINNESOTA. Even in unusually deep trenches, Transite is installed quickly, easily, economically. Its great strength and flexible couplings guard against breakage due to heavy backfill.



New installations of J-M Transite Pipe are made every day all over the U.S. . . . and every one brings lower costs . . . increased efficiency

Combined in J-M Transite Pressure Pipe are all the advantages that mean efficient, low-cost water transportation. And the rapidly increasing use of this modern water carrier offers real proof of the many savings it effects . . . from installation throughout years of practically maintenance-free service.

Operating costs are reduced, because Transite's initial high carrying capacity (C=140) can never be lowered by tuberculation. That means permanently low pumping costs . . . with no shutdowns for expensive cleaning to remove tubercules. These savings alone are enough to make large reductions in water-carrying costs.

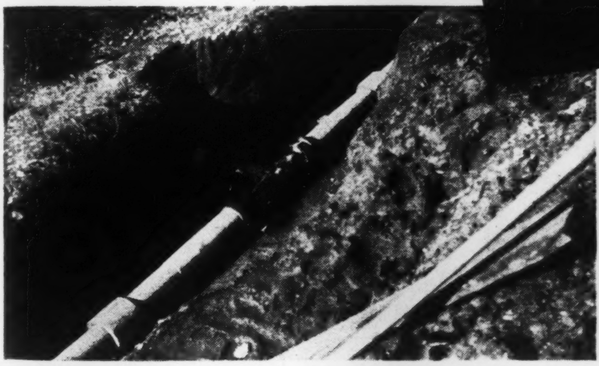
And Transite Pipe saves on maintenance charges, too. Being asbestos-cement in composition, therefore non-metallic, it is immune to electrolysis . . . and highly resistant to all forms of soil corrosion. Bottle-tight Simplex Couplings prevent leakage and the resulting breakage of pipe caused by the undermining of supporting soil.

Long life and economical service aren't all, however. Savings start at installation. For Transite is unusually light and strong . . . easy to transport and handle. On the job, its long lengths can be rapidly assembled by unskilled labor. Simplex Couplings further speed up installation . . . eliminate the need for heating equipment in the trench. Added all together, these features provide sizable savings at every step of the work.

A thorough check-up on these and many other advantages of J-M Transite Pressure Pipe will show you more ways to save. Get the whole story by writing for the Transite Pressure Pipe brochure, to Johns-Manville, 22 East 40th St., N.Y.C.

JOHNS-MANVILLE JM PRODUCTS

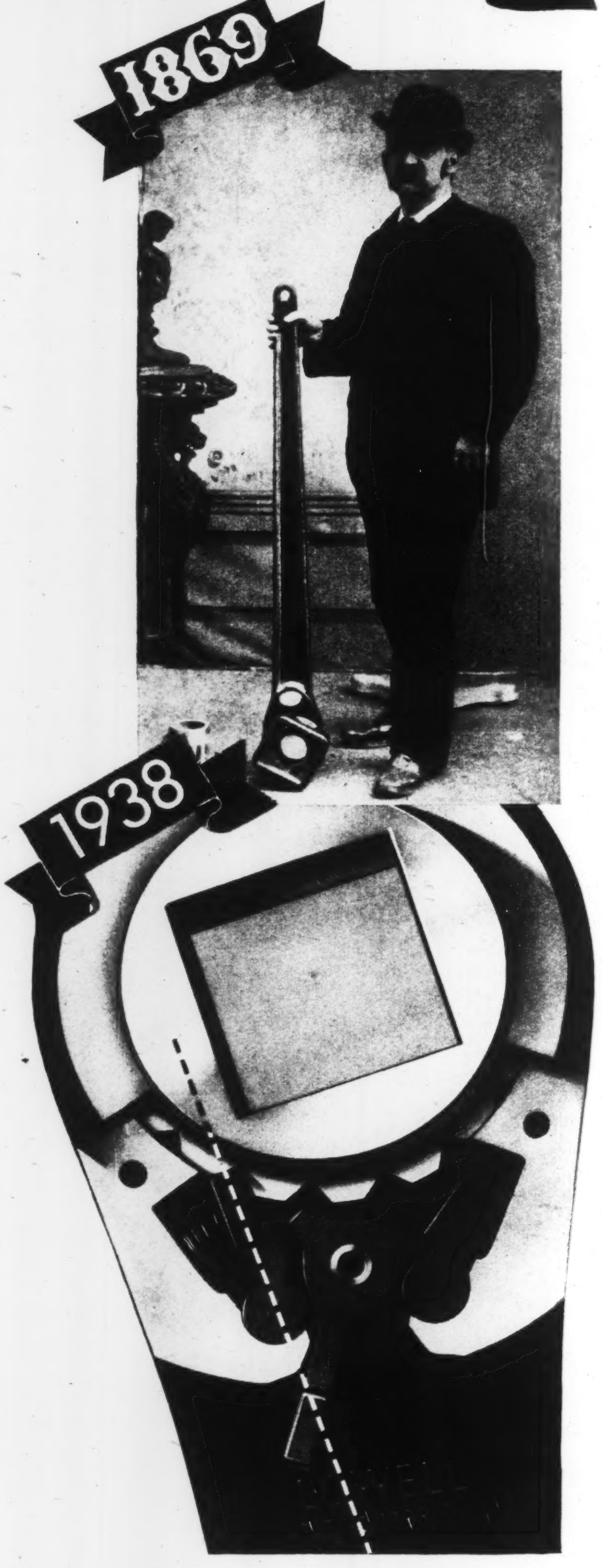
Johns-Manville
TRANSITE
PRESSURE PIPE
An Asbestos Product



ARKANSAS. Connections to fittings are easily made in Transite lines. Service connections, too, are cut into the line quickly and easily with standard tapping tools and methods. Connections may be made while the main is under pressure.

MASSACHUSETTS. Simplex Couplings assure permanently bottle-tight joints. Consisting of a Transite Sleeve and two rubber rings, they are quickly, easily assembled . . . caulking and large bell holes are eliminated.

TIME MARCHES ON



The name LOWELL represents the LARGEST and OLDEST COMPANY devoting its entire time to the manufacture of REVERSIBLE RATCHET WRENCHES.

During our 70 years, as TIME MARCHED ON to better tools, so did LOWELL, giving users BETTER, STRONGER, and more DURABLE wrenches.

We went from 20 tooth gears to 16 tooth, giving LONGER LIFE, and from curved to straight pawls, making STRONGER and SAFER tools. We now, as in the past, have a STRONGER and SAFER construction than any other similar tool on the market.

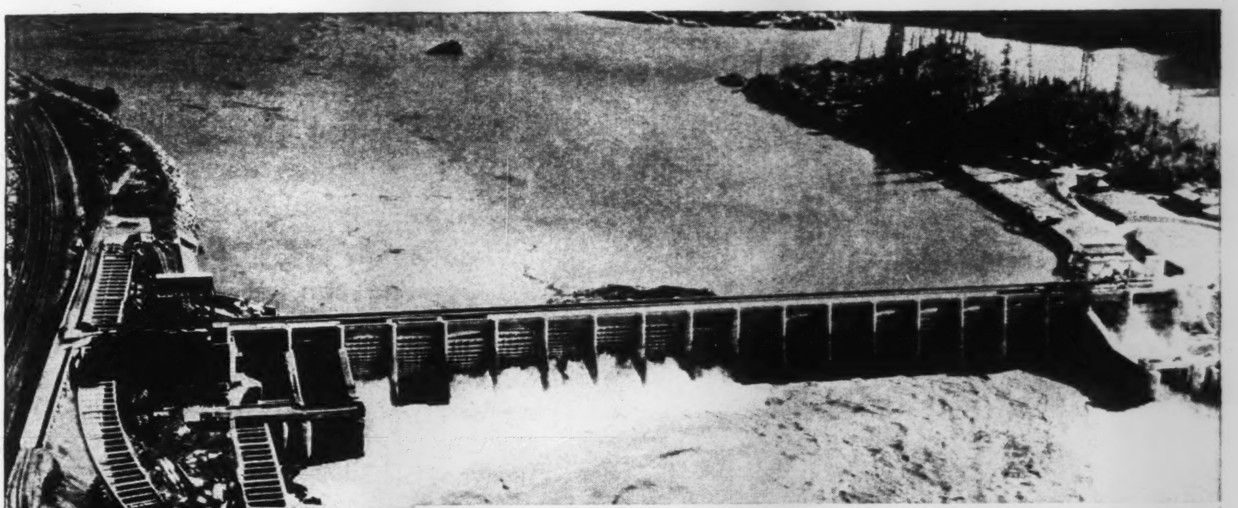
LOWELL STEEL SOCKET BRIDGE REVERSIBLE RATCHET WRENCHES are giving SATISFACTION and SERVICE in hundreds of jobs today, the same as they always have. They have stood the test for years and are covered by the GUARANTEE: Any broken handle returned to us will be replaced without charge.

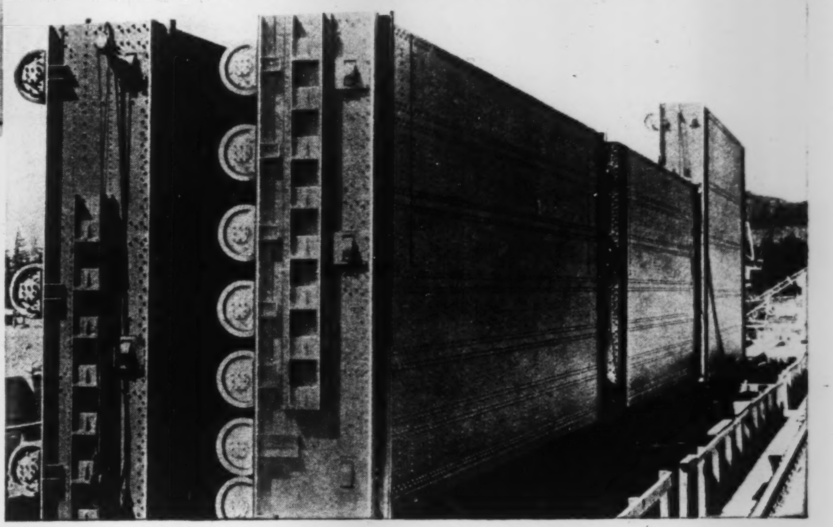
Ask your Dealers about LOWELL REVERSIBLE RATCHET WRENCHES.

Satisfied Customers are our best Advertisements. Write to us for Catalogue E and for any further information desired.

LOWELL
WRENCH COMPANY
WORCESTER MASS.

Twenty great steel lift gates for
BONNEVILLE SPILLWAY DAM





Above—Downstream side of spillway dam which extends from the Washington bank of the Columbia River, across the north channel, to Bradford Island at the extreme right.

Right—Completely erected gate panels—2 of which form a complete gate—on top of spillway piers ready for insertion into guide grooves on the pier sides. View shows upstream face and roller bearings.

BONNEVILLE DAM is a part of the comprehensive plan for power and navigation development of the Columbia River. It comprises a 1300-ft. spillway dam across the north channel, and a power house and navigation lock at the south channel — Bradford Island dividing the river into two channels at this point.

For the spillway dam, here shown, American Bridge Company fabricated and erected 20 vertical lift steel gates, thirteen of which are 50 feet and seven, 60 feet high. Each gate is built in 2 panels (lower 20 feet and upper 30 feet high for a 50-ft. gate) and weighs approximately 260 tons. These gates roll in pier grooves and are operated by direct lift from two gantry cranes which travel on a service bridge.

Bonneville Dam was constructed under the direction of the Corps of Engineers, U. S. Army.

AMERICAN BRIDGE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

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Minneapolis New York Philadelphia St. Louis

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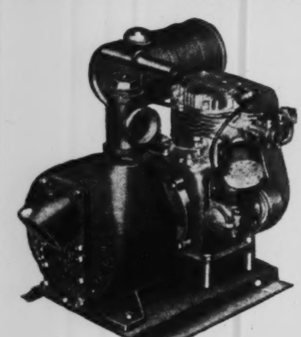
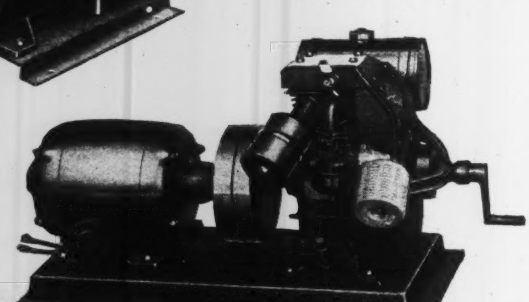
UNITED STATES STEEL

YEARS OF PROVEN DEPENDABILITY FAVOR STERLING



There's a reason why the largest contractors select Sterling Construction Equipment for their most important jobs. Sterling has manufactured thousands of Pumps, Hoists, Saw Rigs and Generating Plants. Contractors everywhere have found they can do more work at less cost with Sterling Equipment because Sterling's Fully Developed, Thoroughly Tried and Proven Design assures DEPENDABLE PERFORMANCE.

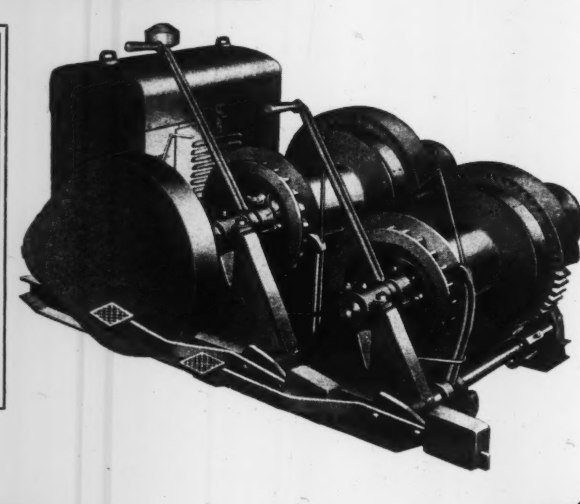


Use Sterling Service That Saves — saves because Sterling can furnish exactly the right equipment for the job.

Ask for literature and prices on Sterling PUMPS — HOISTS — SAW RIGS — GENERATING PLANTS.

DREDGE PUMPS

Sizes range from 4″ to 10″ and can be furnished either in belt driven types or direct connected to electric motors or gasoline or oil engines.

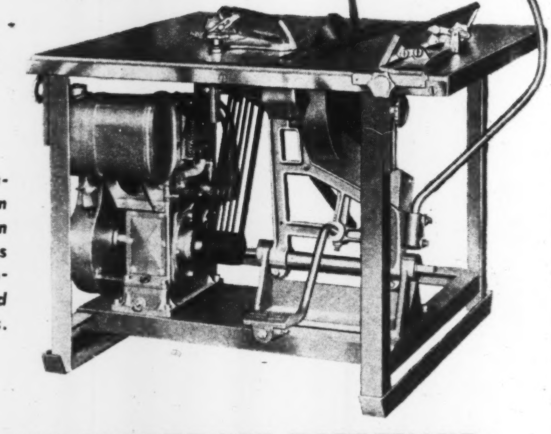


A COMPLETE LINE

There's no need to compromise—no need to let an ordinary pump slow up your job. Sterling manufactures all sizes from 1¼″ to 10″ and there are several different models and types in each size—Low head pumps—Medium head pumps — High head pumps.

SIMPLE
DEPENDABLE
RUGGED

Sterling Construction Equipment on your job means increased production and larger profits.



Sterling
MACHINERY CORPORATION

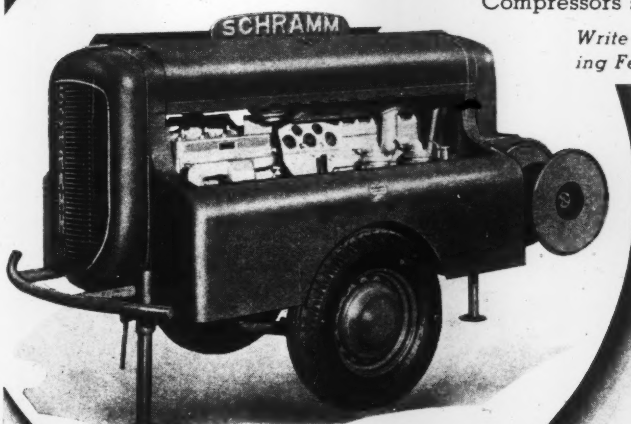
405-413 SOUTHWEST BOULEVARD
KANSAS CITY, MO., U.S.A.

USE YOUR OWN CAR TO MOVE SCHRAMM COMPRESSORS ON THE JOB . . . EASIER, FASTER

New, streamlined, lightweight SCHRAMM "Utility" Compressors will not cost you any more to move to your job than the cost of driving your car. This DeLuxe two wheel trailer is smooth, easy-riding — the lightest, fastest, most economical portable compressor of today. Couple it to your own car . . . hit it up to 50 miles. The SCHRAMM goes along with you. Tools and equipment go along, too, in the large, roomy tool boxes.

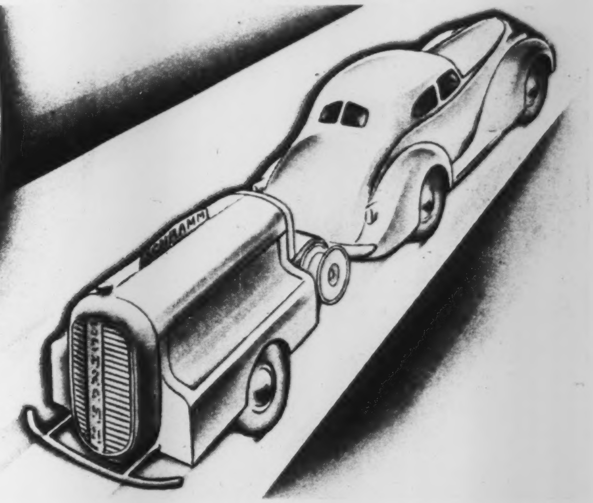
SCRHAMM "Utility" Compressors are the last word in every detail. In engineering design they compare with the latest principles of the modern automobile. In operating features, there are more refined details that save you money. SCHRAMM design has contributed LIGHTWEIGHT. Lightweight means ECONOMICAL TRANSPORTATION. That is why SCHRAMM Compressors save you money.

Write for Bulletin 3700-GG Illustrating Money Saving Features of SCHRAMM "Utility" Compressors



MODEL 105

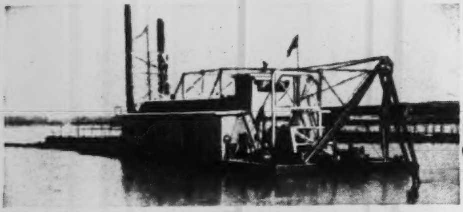
"Utility" Compressor on deluxe 2 Wheel Trailer Mounting



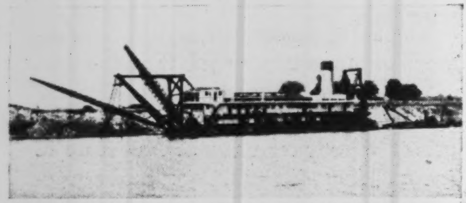
SCHRAMM, INC., WEST CHESTER, PENNA.

SCHRAMM AIR compressors

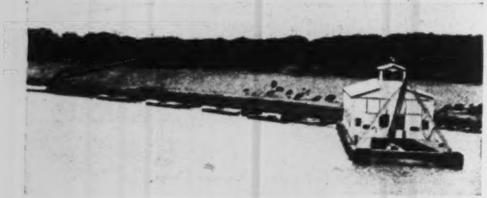
Turning Out Big Yardage



One of the four pipe-line dredges at Ft. Peck Dam, in Montana. Each is equipped with two G-E 2500-hp main-pump motors, a G-E 700-hp cutter motor, and G-E control and switchgear

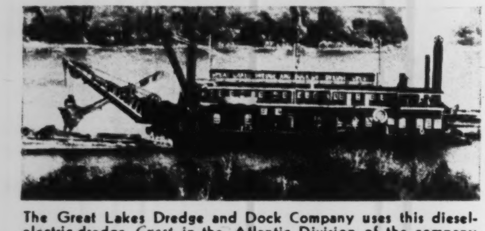


The dredge *Gulf Stream*, owned by the McWilliams Dredging Company, of Chicago and New Orleans. A G-E 4000-hp steam turbine drives the main pump, and a G-E 750-kw turbine-generator supplies current for the other operations



This 28-inch dust-pan dredge, equipped with G-E synchronous main motor and G-E variable-voltage auxiliary drives, operates in the Loup River Public Power and Irrigation District, Columbus, Nebraska.

The *Marshall C. Harris*, a 27-inch suction dredge owned by the American Dredging Company, of San Francisco and Oakland. Speed of the main pump is controlled by the money-saving G-E Scherbius system of control



The Great Lakes Dredge and Dock Company uses this diesel-electric dredge, *Crest*, in the Atlantic Division of the company on all kinds of heavy dredging. The motors and generators with variable-voltage control are General Electric

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with G-E Equipped Dredges

WHETHER keeping channels clear or building mighty earth dams, G-E equipped dredges turn in consistent high-yardage records.

Take the four dredges at Ft. Peck, for example. During the 1937 working season, of 249 days, they pumped 31,672,400 yards of material into the earth-fill dam. That's maintaining an average of 5,900 cubic yards per hour.

As a result of this fast rate, the earthwork will easily be finished during the 1938 working season—a year ahead of schedule!

On all sorts of construction projects you'll find that the correct electric equipment will help you get the speed that cuts time schedules. For any type of electric equipment, just call the nearest G-E office. General Electric Company, Schenectady, New York.

YOU GET GREATER SPEED AND SAFETY, MORE SERVICE FOR YOUR MONEY, WHEN YOU SPECIFY G-E EQUIPMENT

GENERAL ELECTRIC

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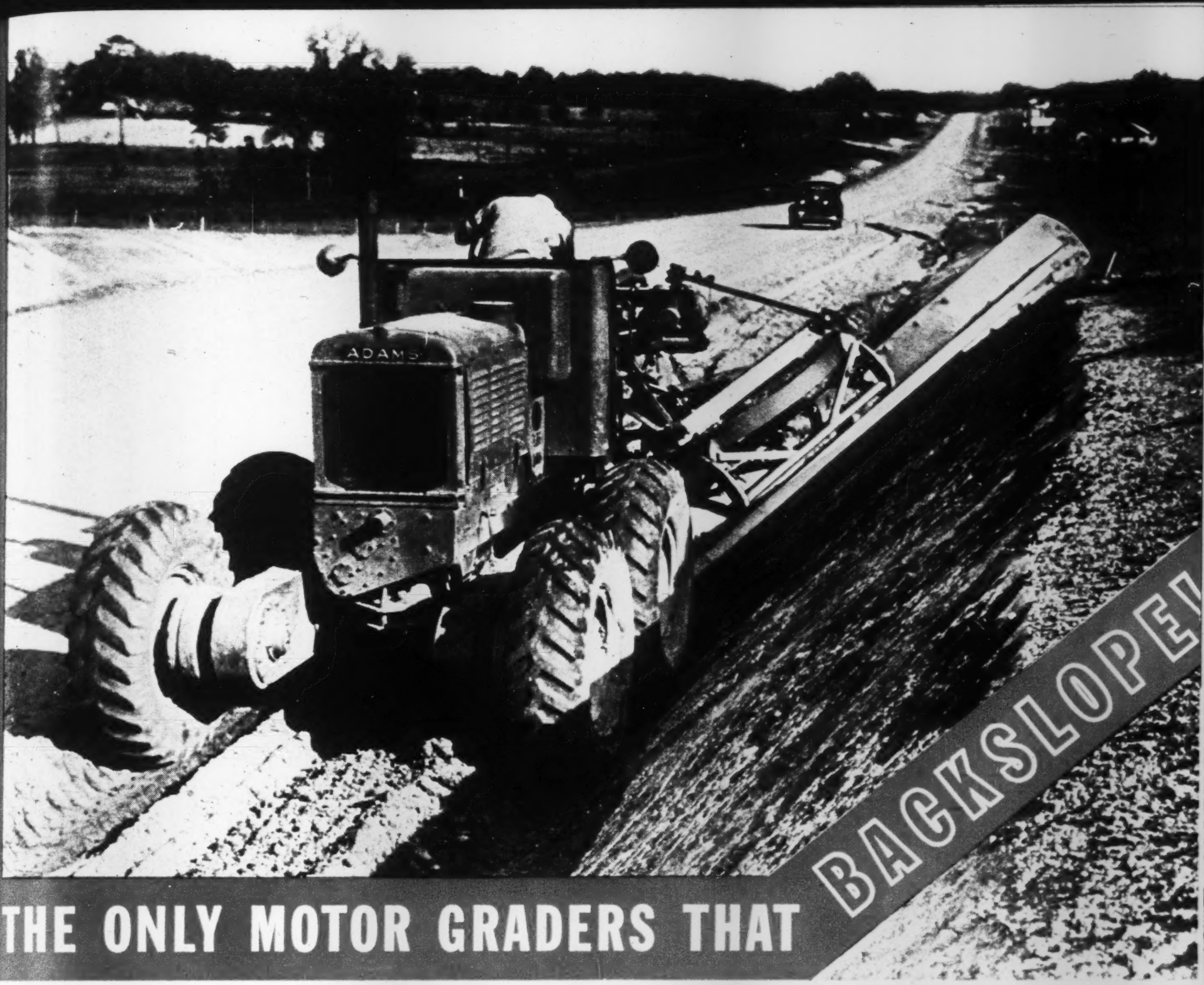


THE ONLY MOTOR GRADERS THAT BACKSLOPE

THE average highway official or contractor of today would not think of buying a leaning wheel grader incapable of cutting back-slopes and high banks. Do you know that there are motor graders available now which will not only do heavy ditch work, but which will make almost any bank cut that can be made with a leaning wheel grader? These machines are Adams Heavy-Duty Motor Graders—the only motor graders on which the blade can be swung outward to make such cuts as illustrated above.

Adams Motor Graders will not only handle your heavy surface maintenance, scarifying, sub-grading, oil-mixing and snow removal, but will do real ditch and bank work for you also—build or rebuild your roads from ditch to ditch. Think of the increased usefulness of such a machine.... Don't delay your investigation of these remarkable graders—get full particulars now from your local Adams representative or write J. D. Adams Company, Indianapolis, Indiana.

* * *

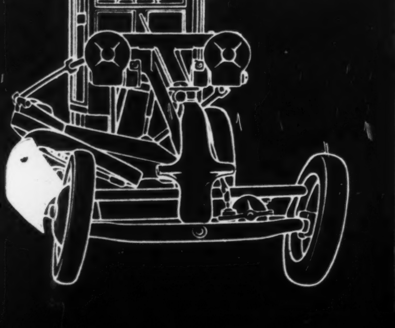
NOTE: The Adams line includes leaning wheel graders, elevating graders, hauling scrapers, etc. Catalogs on request.

BE UP TO DATE IN '38 WITH ADAMS

ADAMS

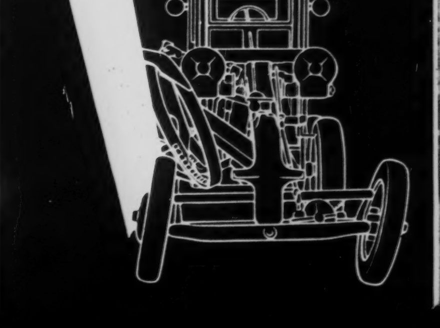
Heavy-Duty

MOTOR GRADERS

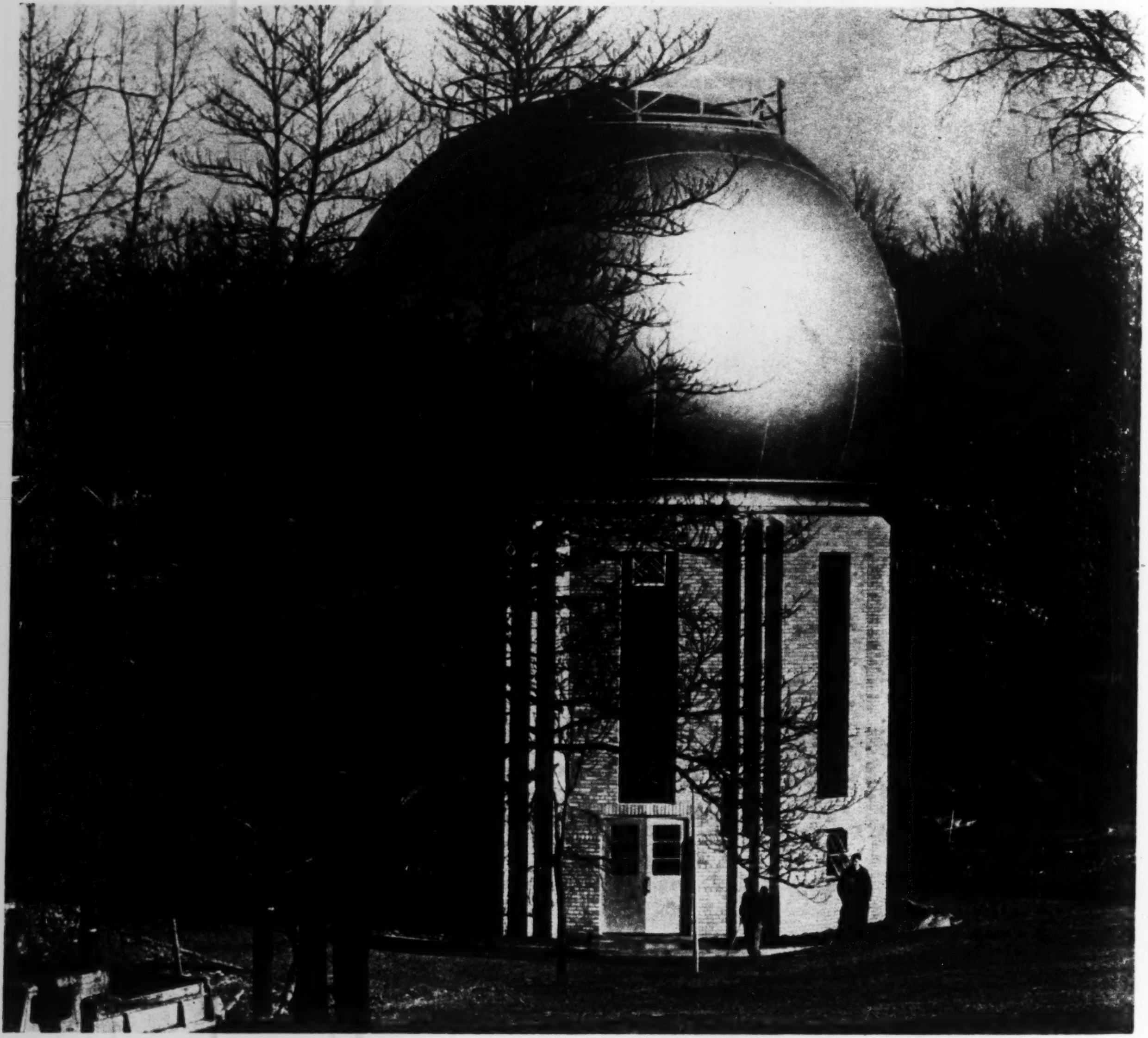


Blade set at sharp angle to cut low, short backslopes on narrow roads where nearby fences and poles are encountered. Flatter and wider slopes can be cut.

Regular 12-ft. blade set to cut a bank 9 ft. high. Practically any backslope angle between the two extremes shown can be obtained.



Pear-shaped tanks are EXTRA SPECIAL



When we build a tank which is not in accordance with one of our standard sizes we call it a special design. Such special designs are not uncommon, as the location or use of a tank often requires specific dimensions which do not coincide with standards.

The structure illustrated above is not only a special design but it is also a special shape. Pressure vessels are usually spherical or cylindrical with symmetrical ends. This one is larger at one end than the other—being shaped like a huge pear. The small end, which points downward, is housed in.

It provides insulation for apparatus used to smash atoms at the Carnegie Institution of Washington. The diameter at the largest point is 37½ ft. and the height of the shell 55 ft. Welded construction was used throughout.

In addition to special designs, we are equipped to design, fabricate and erect steel storage tanks, elevated water tanks, spherical and spheroidal tanks in standard sizes and steel plate work of all kinds. Write our nearest office for estimating figures.

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B-594

Plants at BIRMINGHAM, CHICAGO and GREENVILLE, Pa.

LE ROI

...THE RECOGNIZED STANDARD IN THE CONSTRUCTION FIELD

POWER
LE ROI
AIR

Power!

Le Roi Engines, 4 to 400 h. p., the choice of the construction industry for tried, tested and proved power on all types of equipment.

Air!

Le Roi-Rix Air Compressors are available in all sizes and styles . . . All portable models have spring mountings and both the valve-in-head engine and compressor are built by Le Roi.

SINCE its inception — Le Roi Company has been guided by the policy that its success is directly related to the success of its products . . . Hence, its strict adherence to practical designs — select materials and precision standards of manufacture . . . Engines and air compressors bearing the Le Roi name represent highest values » » »

LE ROI COMPANY MILWAUKEE, WIS.

SIX years of actual service behind ADNUN PAVERS
There are more ADNUN BLACK TOP PAVERS in Service than any other make!

SINCE 1932 Adnun Black Top Pavers have been proving that machine laid roads are not only better, but more profitable. Year-round service in the hands of leading contractors, and miles of smoother roads laid, both hot and cold, all point to the superiority of Adnun design and construction.

Adnun Black Top Pavers were first to give you such exclusive advantages as the Two Speed Cutter Bar, the Power Cut-off, Continuous Course Correction, Adjustable Screed Speed—and now the latest Adnun development—Perfected Hydraulic Controls, for effortless operation that brings even better control and puts the Adnun far in advance of any other similar machine.

Adnun alone brings you the dependability that can only be acquired through years of service in the field. Be sure your next black top paver is an Adnun.

For Stone
The Adnun Finish Spreader—a low cost machine that handles any material and shapes crown or bank. Ask about it.

For Black Top
The Adnun Black Top Paver lays any mix, any width, any thickness! The only Black Top Paver with 6 years actual service behind it. Catalog on request.

THE FOOTE COMPANY, INC.
NUNDA NEW YORK

ADNUN
TRADE MARK REGISTERED
BLACK TOP PAVER
with Hydraulic Controls

CONCRETE MIXING—TRANSPORTING—PLACING COSTS LESS WITH REX CONSTRUCTION EQUIPMENT

REX CONCRETE MIXERS

(3½ cu. ft. to 2 yd. sizes)

Mixing costs go down when one of these portable Rex huskies takes over the job. From the little Rex 3½-S to the rugged Rex 14-S, each is built to take all you can give it and ask for more. These Rex mixers give you the exclusive, cost-cutting advantages of pressed steel drum-heads and drum rollers, positive chain drives, motor mounted "above the dirt line," the Rex shimmy skip and Rex positive water control. Get the catalog and new 1938 low prices on the sizes which interest you.

REX MOTO-MIXERS AND AGITATORS

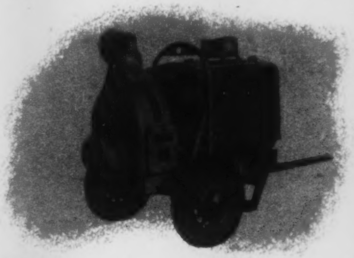
(1 yd. to 7½ yd. sizes)

Rex Moto-Mixers and Agitators, with their patented cone end drums, front drum suspension and flexible chain drives, have long led the field in the race for lower ready-mixed concrete costs. Built in sizes from 1 to 7½ cubic yards—each is backed by the millions of yards placed by Rex Moto-Mixers on the nation's greatest concreting projects. Send for the new book, "Payloads for '38" to get the low-down on "what's what" in the truck mixer field.

REX SPEED PRIME PUMPS

(7,000 g. p. h. to 125,000 g. p. h.)

Now Rex brings you a line of contractor's pumps built to the highest standards in the industry and at the lowest price in years. Rex Pumps, with Z-Metal impellers and air-expelling Rex "Peelers," move more water per day—at less unit cost—on any type or size of job. Built in capacities from 2" 7-M to 8" 125-M, with several types of mountings available. The new 1938 catalog tells why they're the contractor's greatest water movers. Get your copy now.



REX PUMPCRETE

(15 cu. yds. per hr. to 65 cu. yds. per hr.)

No other placement system in the world can approach the low unit cost records established by the Rex Pumpcretes *on jobs of so many sizes and types.* These concrete pumps, with capacities ranging from 15 to 65 cubic yards per hour, have been the answers to many cost problems—why not yours? Ask for your copy of the new 52-page Pumpcrete Catalog.

REX 27-E AND 34-E PAVERS

Here are the paving world's two "mechanical marvels"—the Rex 27-E Single Drum and the Rex 34-E Duomatic Pavers for 1938. Backed by the thousands of miles of experience behind the Rex 27-E, the Rex Mechanical Man for the first time brings automatic, perfectly-timed control to the 34-E Paver field. Send for details on these two great machines.

GET DETAILS NOW! SEND THIS COUPON

Now, when costs are playing such an important part on all construction jobs, check up on the Rex Construction Equipment line—you'll find many ways to save money—many ways to get a greater majority of the jobs in your territory.

Send for the literature on the Rex machines listed on this page.

CHAIN BELT COMPANY

Chain Belt Company, Construction Equipment Division
1633 W. Bruce Street, Milwaukee, Wisconsin
Please send me the catalogs I have checked below:
Rex Mixers ☐ 3½-S, ☐ 5-S, ☐ 7-S, ☐ 10-S, ☐ 14-S (Check which)
☐ "Payloads for '38"—Rex Moto-Mixers and Agitators
☐ Rex Speed Prime Pumps
☐ "Concrete by Pipe Line"—Rex Pumpcrete ☐ Rex Pavers

Firm Name ....

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Address ....

City .... *State* ....

"Floors Shall be
Resurfaced with
NO LOST TIME!"

"THIS floor shall be resurfaced without loss of use to the owner!" So read the specifications for many a heavy-duty floor-resurfacing job; because owners have now learned that it isn't necessary to tie up a busy plant waiting for concrete to harden. Example:

Bakelite Corporation secured bids on the basis of no lost time, when floor of their Bound Brook, N. J., plant was resurfaced recently. Using 'Incor' 24-Hour Cement, one section, placed Christmas Day, was in use when business resumed. The other section was placed New Year's Day, with the same result. *Not a working day lost!*

Typical of the swing to 'Incor' for heavy-duty floors and all other watertight structures where thorough curing in a fraction of the usual time prevents costly delays and helps assure strong, dense, impervious concrete that keeps water in or out.

For 'Incor' gives you the same kind of quality concrete that Lone Star Cement has been producing for more than a quarter century. Only difference is that 'Incor'* cures faster, is ready to use sooner. Write for copy of "Heavy-Duty Floors." Lone Star Cement Corporation, Room 2211, 342 Madison Ave., New York.

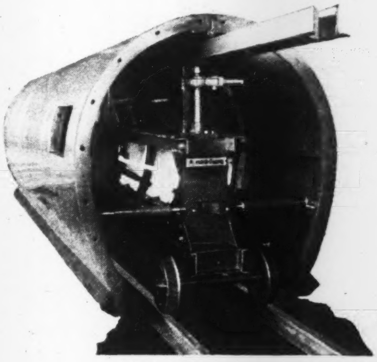
*Reg. U. S. Pat. Off.

LONE STAR CEMENT CORPORATION

MAKERS OF LONE STAR CEMENT . . . 'INCOR' 24-HOUR CEMENT

PRODUCTS OF LANCASTER IRON WORKS, INC.

MAYO'S STEEL FORMS



STEEL FORMS FOR TUNNELS, SEWERS, AQUEDUCTS, WALLS, TUNNEL SHIELDS - - AIR LOCKS

ROBERT S. MAYO
Construction Engineer LANCASTER, PA.

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GENERAL STEEL PLATE CONSTRUCTION

100,000 GALLON

ELEVATED TANK

The design, fabrication, and erection of all types of riveted and welded steel plate work. Our Pattern Shop, Grey Iron Foundry, Machine Shop, Plate Shops and Erection Crews under one direction make possible complete deliveries at reasonable prices. Our location close to the steel mills, and our railroad facilities, enable us to give quickest deliveries.

IROQUOIS

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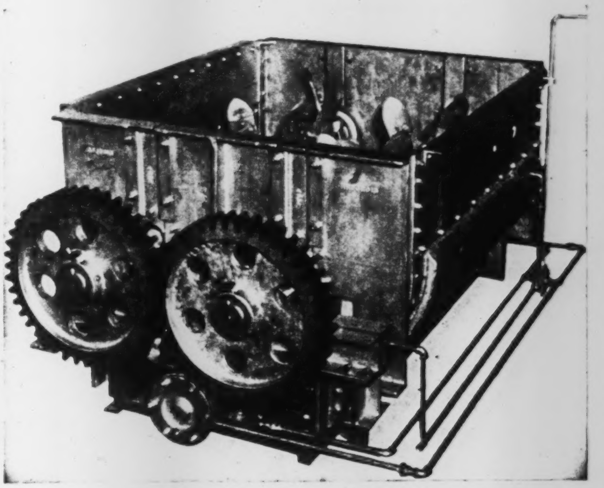
ASPHALT PLANT EQUIPMENT

FORMERLY MANUFACTURED BY THE BARBER ASPHALT CORPORATION IS NOW BEING PRODUCED BY OUR **IROQUOIS DIVISION**



IROQUOIS TWO TON MIXER

We are in a position to furnish complete

**ASPHALT PAVING PLANTS,
HOT AND COLD MIX DRIERS,
TOOLS, PUG MILL MIXERS, KETTLES,
STEAM JACKETED PIPE AND FITTINGS
AND REPAIR PARTS FOR ALL EXISTING
IROQUOIS EQUIPMENT**

The "Lancaster" Rapid Batch Mixer

Stationary or Portable Units

BETTER CONCRETE
from
Lowered Water Ratio
Less Segregation
More Plasticity
Uniform Coating of Aggregate
Uniform Color for Colored Cements

Material can be fed directly into mixer, or by means of stationary hopper or elevator hopper. The pan rotates slowly, conveying materials to the "whirlpool" created by rapid counter-current action of mixing plows. The mixed batch is quickly and cleanly discharged through clever central discharge valve in center of pan. Wide selection of sizes and types.

Send for Bulletin 70-B

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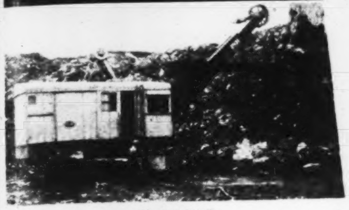
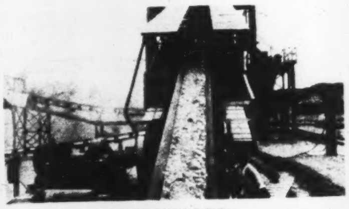
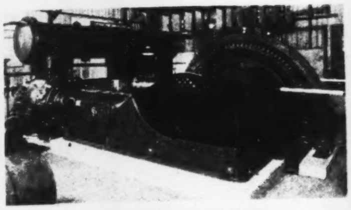
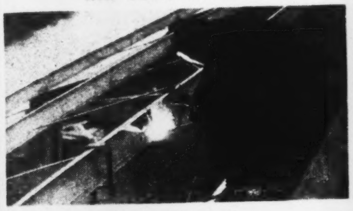
WESTINGHOUSE-EQUIPPED MACHINERY SPEEDS JOBS . . . CUTS CONSTRUCTION COSTS


SHOVELS


CONVEYORS


AIR COMPRESSORS


ARC WELDERS

PUMPS

LOCOMOTIVES

DREDGES

FLOODLIGHTS

FROM EXCAVATION TO OPERATION WESTINGHOUSE IS ON THE JOB!

Dependable power for a host of uses is an important factor in the construction and operation of buildings, dams, bridges and highways.

The exacting demands and varied requirements of the construction industry have been met by Westinghouse through extensive engineering research, manufacturing, and testing facilities. The result is a line of equipment particularly adapted for efficient production, control and utilization of electric power.

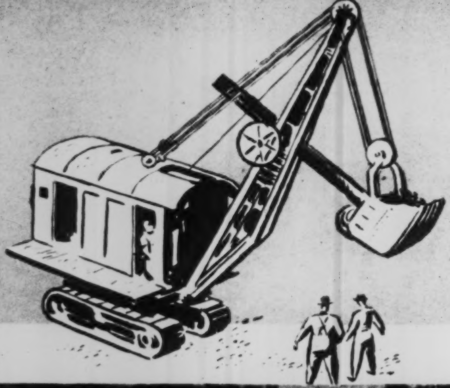
This and following pages illustrate some of the wide variety of products, ranging from generators for making power to the lamps in the socket or the motor in a hand drill, that can be obtained from a single source—Westinghouse.

Westinghouse

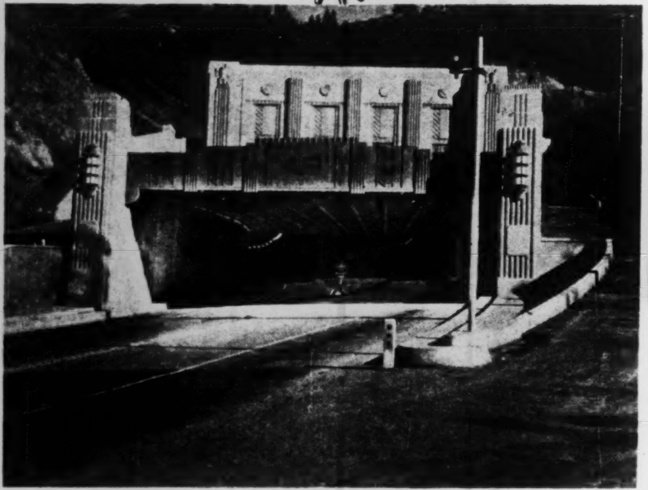
WESTINGHOUSE ELECTRIC

PARTNER OF THE CONSTRUCTION INDUSTRY

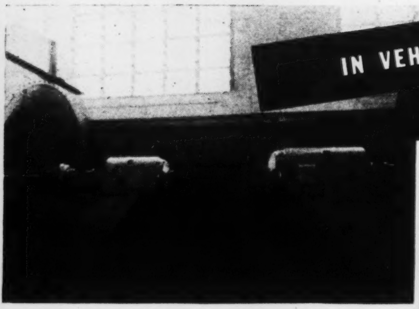
J93840



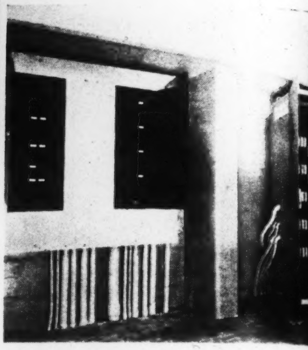
FROM EXCAVATION TO OPERATION
Westinghouse IS ON THE JOB..



IN VEHICULAR TUNNELS



This tunnel, electrified by Westinghouse, illustrates the electrical engineering assistance and undivided responsibility for a complete installation that can be obtained on any construction project.

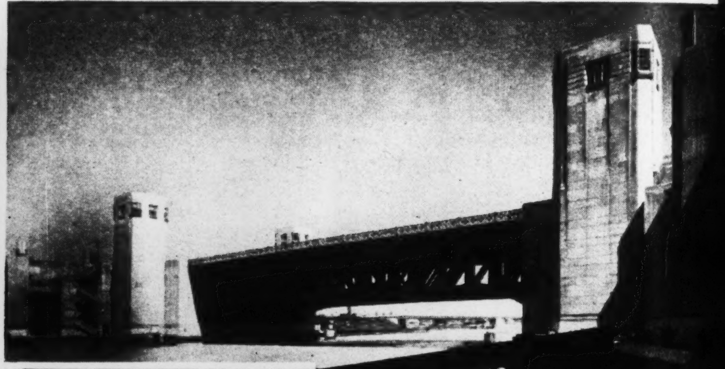


ON HIGHWAYS

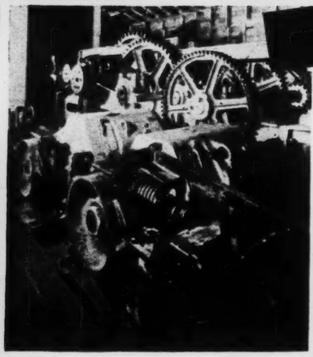
By matching visibility against speed, Westinghouse highway lighting helps reduce the toll of night accidents.

These BEFORE and AFTER pictures show what can be accomplished by scientifically designed illumination.

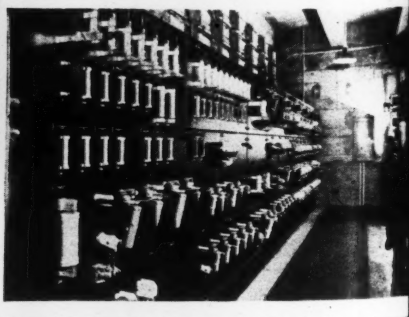
ON BUYWAYS



ON BRIDGES



Another major installation of Westinghouse equipment is for the control of the world's largest bascule-type bridge, pictured above.



WESTINGHOUSE ELECTRIC

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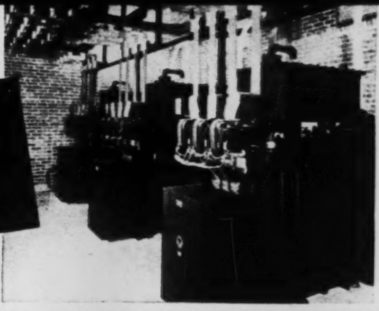
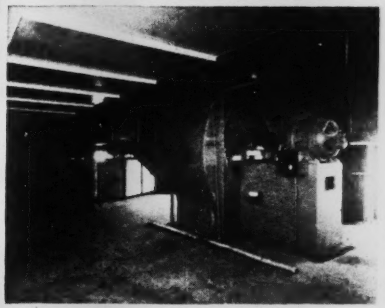
Westinghouse

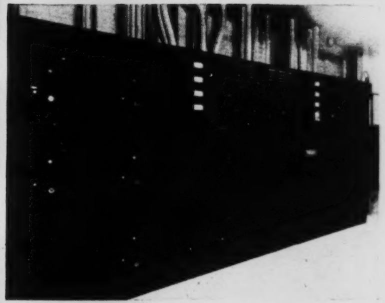
IN COMMERCIAL . . . INDUSTRIAL
. . . AND PUBLIC BUILDINGS



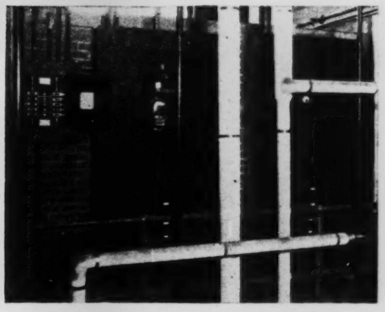
Transformers and bus structure for reducing high tension power for use in a public building.



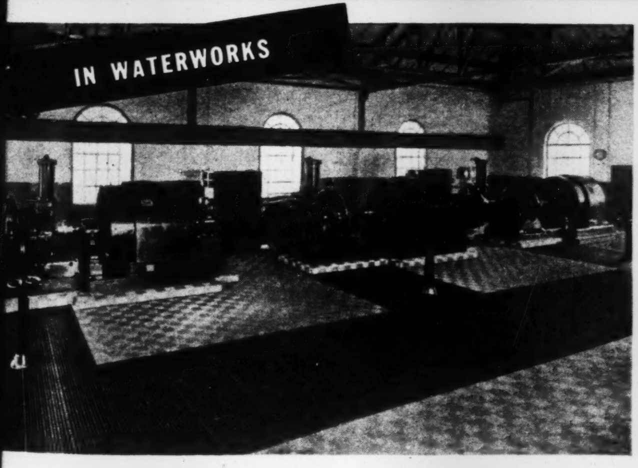
Quiet operating Westinghouse motors driving blowers in an office building.



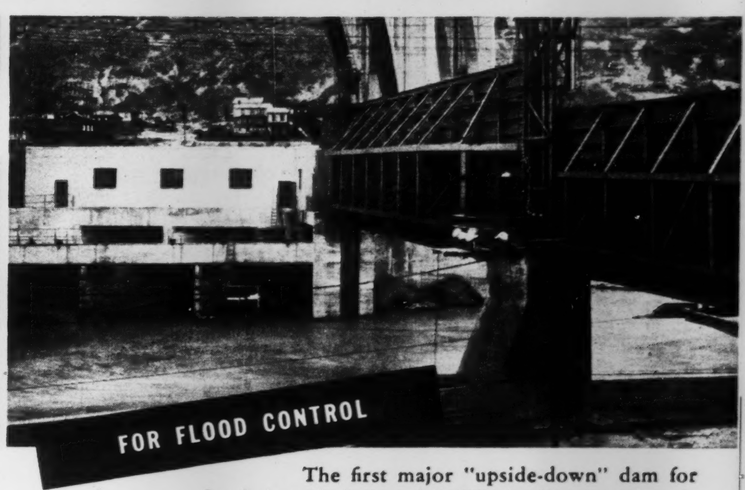
Factory assembled metal-clad switchgear installed in a public building.



Nofuze lighting and power panelboards provide fuseless protection in a prominent hospital.


IN WATERWORKS

51% of cities 100,000 and over have at least one water works or sewage disposal plant largely electrified by Westinghouse.


FOR FLOOD CONTROL

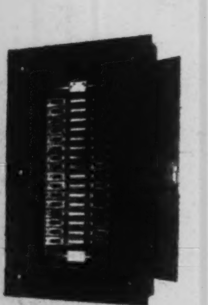
The first major "upside-down" dam for flood control, designed by Westinghouse engineers, to protect against future disasters.

PARTNER OF THE CONSTRUCTION INDUSTRY

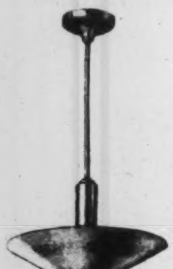
FROM EXCAVATION TO OPERATION

WESTINGHOUSE EQUIPMENT

EVERY SIZE . . . EVERY TYPE



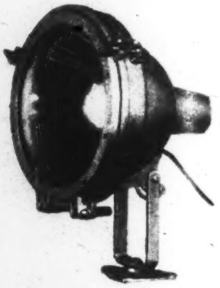
PANELBOARDS—Tamper-proof Nofuze panelboards for lighting, distribution and power circuits.



MAGNALUX—One unit in a complete line combining beauty with proper illumination.

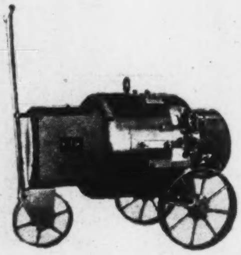
MILLITE—A heavy-duty, dust-tight and vapor-proof luminaire for industrial use.

COMBINATION LINESTARTER—One of many types of control fitted to the job.



FLOODLIGHTS—A complete line of floodlights for every application.

SWITCHBOARDS—Circuit breaker type low-voltage—are safe, compact and easily assembled.



ARC WELDERS—A complete line of welders without meters, rheostats, exciters and other gadgets.

MOTORS—20,000 different types, sizes and ratings to meet any requirement.

BACKED BY A COMPLETE SERVICE THAT ASSURES DEPENDABLE EQUIPMENT FITTED TO THE JOB . . .

1. Experienced Westinghouse engineers work hand-in-hand with consulting engineers in planning the most up-to-date, correctly designed electrical equipment for the installation.
2. Careful Investigation and Field Tests under actual operating conditions in all industries supply data that leads to continuing product refinements.
3. Unexcelled Testing Facilities subjects Westinghouse equipment to punishment far beyond the requirements of actual service.
4. 36 Service Shops, strategically located, assure prompt repairs in emergencies.
5. One Source of Supply and responsibility for the entire electrical installation because of the diversity of Westinghouse products and close cooperation with the Westinghouse electrical wholesalers' organization.

The Westinghouse representative in a city near you can place these Westinghouse assets at your disposal. Why not call him when planning your next construction job? Westinghouse Electric & Manufacturing Company, East Pittsburgh, Penna.

J93840

Westinghouse

WESTINGHOUSE ELECTRIC

PARTNER OF THE CONSTRUCTION INDUSTRY

30 days faster with LEHIGH EARLY STRENGTH CEMENT

Arnold Constable Company Department Store (150 ft. x 150 ft.), New Rochelle, New York

August 4, 1937— Excavation started

August 14, 1937— First concrete poured

August 15, 1937—First forms stripped for re-use

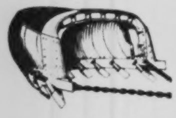
August 23, 1937—Last forms stripped and steel erection begun

November 25, 1937— Opened to the public—100 working days for entire operation

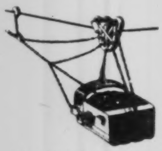
Architect:
Kenneth Franzheim, New York
General Contractor:
M. Bartnett & Sons, New Rochelle
Concrete Contractor:
Hernandez Contracting Co., Inc. Yonkers

To cash in on fall trade, the owners insisted upon quick building. By careful planning and the utilization of new, better, faster methods and materials, M. Bartnett & Sons, General Contractors of New Rochelle, turned the building over to the owners in record time. Only ten days after the excavation started Hernandez Contracting Co., Inc., the concrete sub-contractor, started pouring the concrete for footings and foundations. For speed, Lehigh Early Strength Cement was used—compared with normal portland cement, this was 30 days faster. Forms were stripped the day after pouring and used again for economy. Steel erectors were on the job only 10 days after the first concrete was poured. Lehigh Early Strength Cement reaches service strength in 24 to 48 hours—used under the same conditions the curing time for normal portland cement is 3 to 5 times slower. You can apply this speed to any kind of concrete work. Quick service concrete in key portions may expedite an entire operation like on this department store job. Its use often reduces costs. Shorter job duration means lower job overhead. Form costs are minimum because of quick re-use. In cold weather, heat protection costs are almost negligible. Use Lehigh Early Strength Cement wherever speed is vital or economies will result. Consult the Lehigh Service Department for specific data.

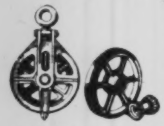
LEHIGH PORTLAND CEMENT COMPANY
Allentown, Pa. Chicago, Ill. Spokane, Wash.



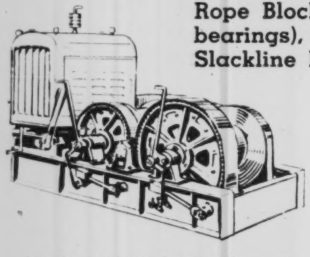
Scraper Bucket



Slackline Bucket



"Durolite" All-Steel Wire Rope Blocks.



Two-Drum Hoists for Dragline and Slackline Operating Duty.

SAUERMAN LONG RANGE MACHINES

For Digging, Conveying, Stockpiling

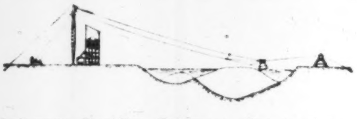
For larger profits on long range excavating and material handling work, use a Sauerman Drag Scraper, Slackline, or Tower Machine. A Sauerman machine is able to span a wide area and convey materials from any point in this area at a rapid rate. One man handles the entire operation.

The sizes of Sauerman machines range from portable units for small excavation jobs up to huge machines with capacities approaching 1000 cu. yd. per hour. There is a special type for underwater excavation, another for digging from a bank, another for storing and reclaiming, and so on.

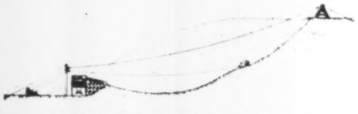
In addition to the complete Sauerman machines, we offer also the various types of Sauerman buckets in sizes from ¼ cu. yd. to 15 cu. yd., "Durolite" Wire Rope Blocks (with either bronze bearings or roller bearings), Roller Bearing Scraper Hoists, Two Speed Slackline Hoists, etc.

Write for 84-page catalog

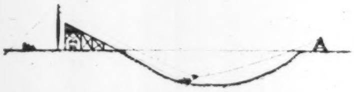
SAUERMAN BROS.
432 S. Clinton St. CHICAGO



Sauerman Slackline Cableway digs in river, pit or pond and conveys to elevated delivery point, such as screening plant.



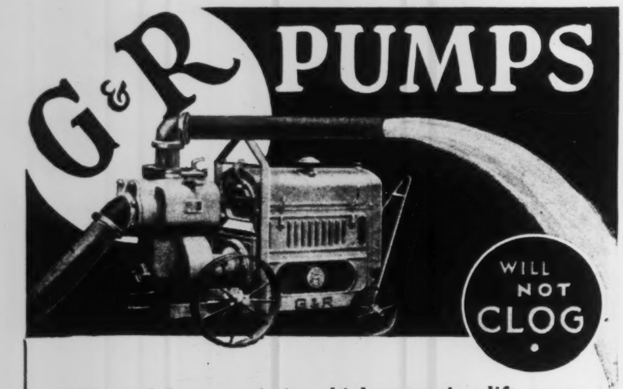
Sauerman Drag Scraper digs in hill, pit, storage pile or long cut and hauls material across ground to hopper or fill.



Sauerman Slackline Scraper digs deep and hauls material up incline into cars.

Sauerman Tower Machine builds levees and handles similar work that calls for making a wide cut extending a long distance.

Sauerman Tower Machine (with ramp that can be raised and lowered) is used for handling large storage piles, also for open pit mining.



***Claims* of fastest priming, highest suction lift, more gallons per minute, etc., *do not pump water.* On the job, the pump must do its own talking, and with dirty water, many a pump is inclined to stutter—and stop.**

Let G & R Pumps tell you their own story on any job. They will deliver as much, and usually more, water *under any condition*, than any other pump. We will ship you one and let you be the judge.

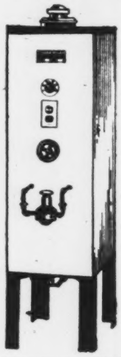
Remember this about G & R Pumps — THEY WILL NOT CLOG — THEY ASK NO TIME OUT. Play safe! Try a G & R Self-priming Centrifugal before you buy any pump this year.

Distributors in 100 principal cities are ready to make prompt delivery of the G & R Pumps you need.

The Most DEPENDABLE Pump for The Least Money

THE GORMAN-RUPP CO. Mansfield, Ohio

Save 32c to 62c Per Gallon By Re-refining Your Oil



GOOD OIL DOES NOT WEAR OUT

DON'T THROW AWAY THE 90% GOOD OIL BECAUSE OF 10% IMPURITIES

When dilution and foreign matter, comprising 10% of the waste oil are removed by scientific re-refining, the 90% of the oil which remains is better than it was when first poured into the engine.

You can re-refine your used oil with a PRECISION REFINER and not only save money but have a better lubricant.

The PRECISION REFINER will re-refine 30 to 40 gallons of waste oil a day at a cost of about 10 cents a gallon.

Write today for complete information.

PRECISION ENGINEERING COMPANY
43RD AND MAIN STREETS.
KANSAS CITY MISSOURI

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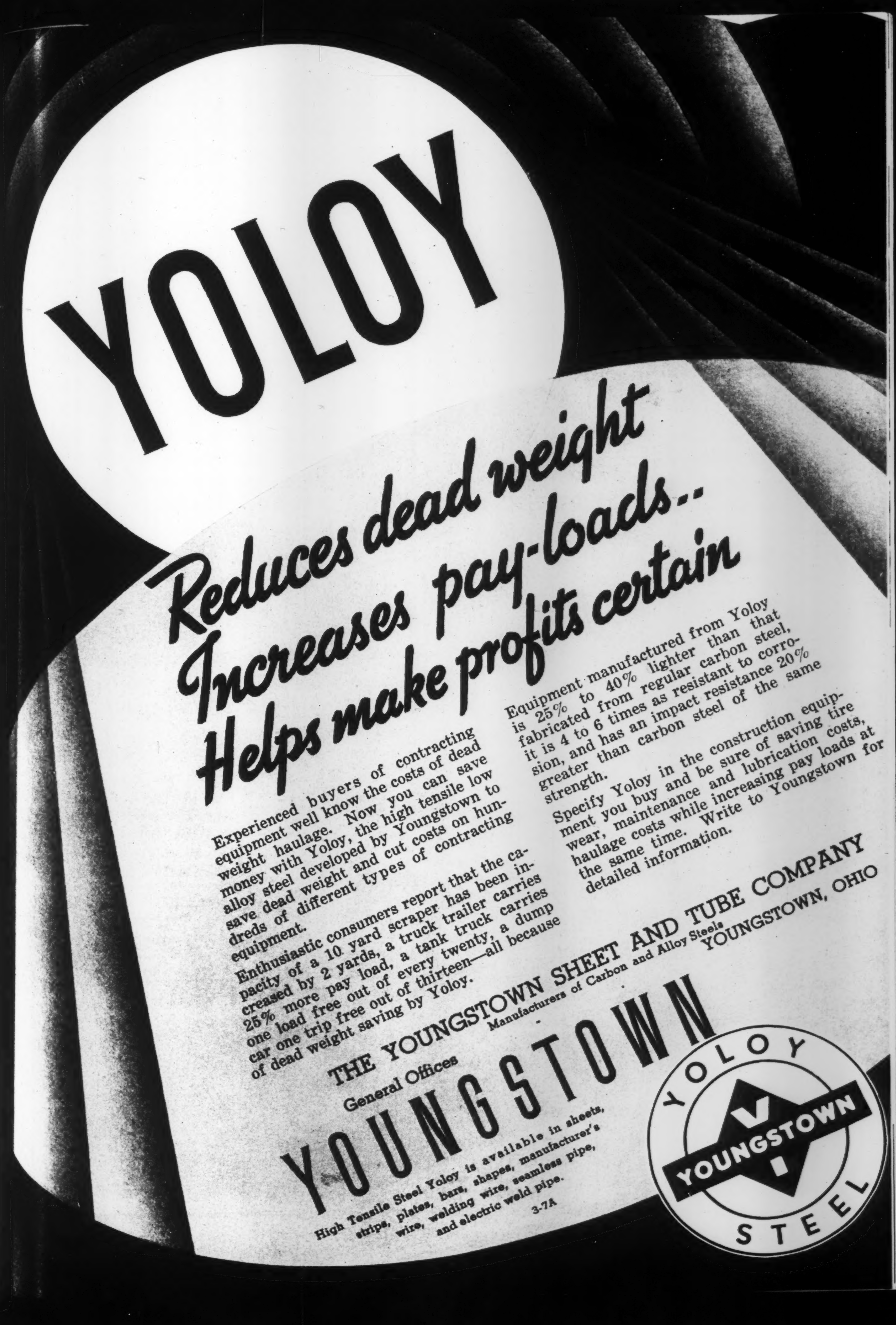
OF THIS ISSUE
ARE AVAILABLE!

SEE PAGE 36



YOLOY

Reduces dead weight
Increases pay-loads...
Helps make profits certain

Experienced buyers of contracting equipment well know the costs of dead weight haulage. Now you can save money with Yoloy, the high tensile low alloy steel developed by Youngstown to save dead weight and cut costs on hundreds of different types of contracting equipment.

Enthusiastic consumers report that the capacity of a 10 yard scraper has been increased by 2 yards, a truck trailer carries 25% more pay load, a tank truck carries one load free out of every twenty, a dump car one trip free out of thirteen—all because of dead weight saving by Yoloy.

Equipment manufactured from Yoloy is 25% to 40% lighter than that fabricated from regular carbon steel, it is 4 to 6 times as resistant to corrosion, and has an impact resistance 20% greater than carbon steel of the same strength.

Specify Yoloy in the construction equipment you buy and be sure of saving tire wear, maintenance and lubrication costs, haulage costs while increasing pay loads at the same time. Write to Youngstown for detailed information.

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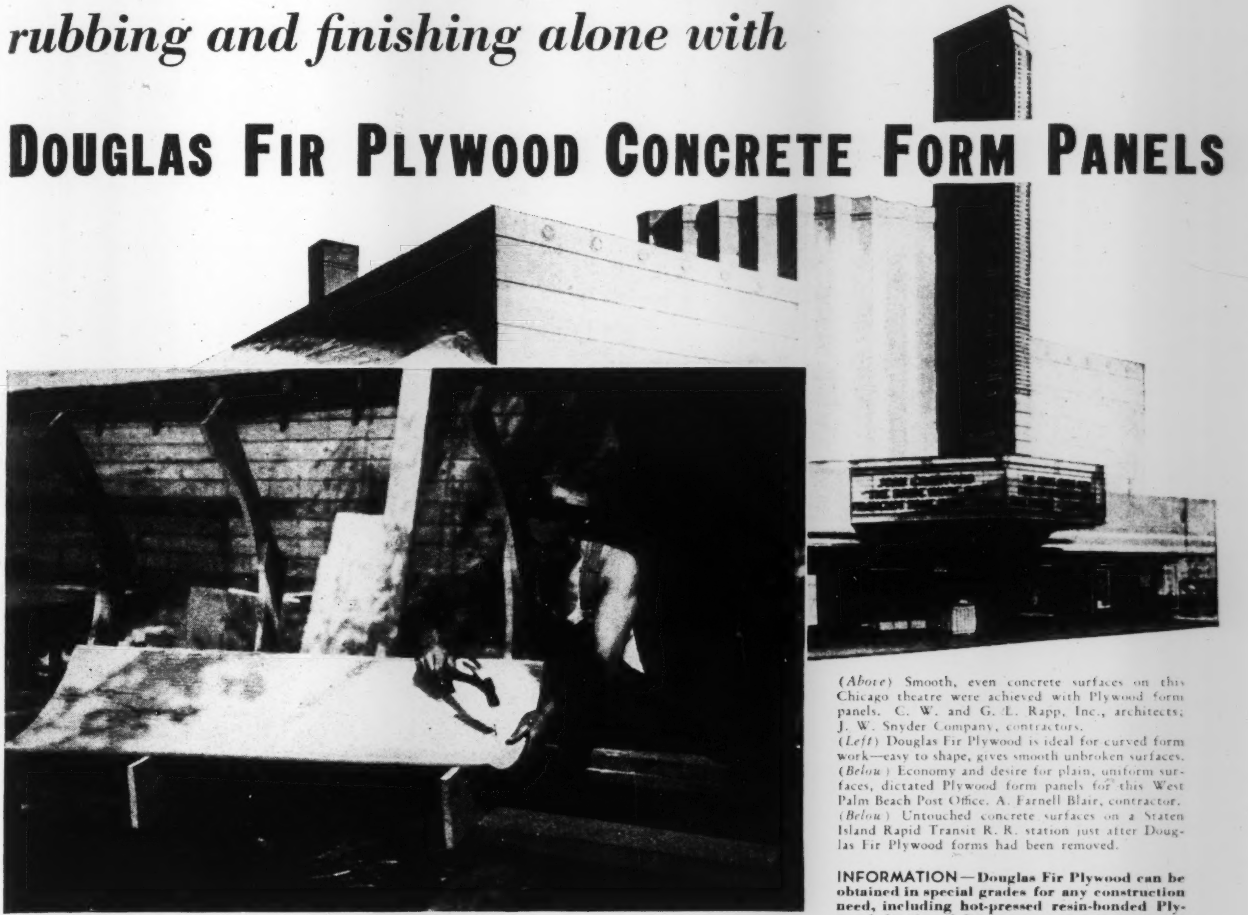
DOUGLAS FIR PLYWOOD CONCRETE FORM PANELS



(*Above*) Smooth, even concrete surfaces on this Chicago theatre were achieved with Plywood form panels. C. W. and G. L. Rapp, Inc., architects; J. W. Snyder Company, contractors.

(*Left*) Douglas Fir Plywood is ideal for curved form work—easy to shape, gives smooth unbroken surfaces.

(*Below*) Economy and desire for plain, uniform surfaces, dictated Plywood form panels for this West Palm Beach Post Office. A. Farnell Blair, contractor.

(*Below*) Untouched concrete surfaces on a Staten Island Rapid Transit R. R. station just after Douglas Fir Plywood forms had been removed.

INFORMATION—Douglas Fir Plywood can be obtained in special grades for any construction need, including hot-pressed resin-bonded Plywood developed for permanent exterior exposures. A well-equipped Technical Division offers cooperation in adapting Douglas Fir Plywood to special problems, and recommending the proper types and grades to produce the utmost serviceability and economy. Technical data and handbooks are available to contractors, builders and architects. Address DOUGLAS FIR PLYWOOD ASSOCIATION, Tacoma Building, Tacoma, Wn.

SAVE MONEY, get better results—on any concrete job. Check up on these multiple advantages of using Douglas Fir Plywood Concrete Form Panels!

1. **TIME AND LABOR SAVING . . .** *Often up to 50%.*
2. **SMOOTH FINISHES, MINIMUM JOINTS . . .** *Less rubbing and finishing labor.*
3. **100% COVERAGE . . .** *No waste allowance necessary.*
4. **MULTIPLE REUSES . . .** *Often up to 15 or more.*
5. **HIGH SALVAGE VALUE . . .** *Can be used for sheathing, sub-flooring after many reuses in forms.*

Plywood Concrete Form Panels are strong and rigid, yet light weight—easy to put up, easy to strip. They come in widths from 12" to 48", in even 2" breaks, in even foot lengths of 4' to 8' inclusive and in thicknesses of 1/2", 9/16", 5/8", 11/16", and 3/4", with special 1/4" form lining available for curved surfaces. Each panel carries the special Plywood Association mark "Concrete Form Panel". Your lumber dealer can supply you with just the type Douglas Fir Plywood you need for that next concrete job. See him today!

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Real Lumber
MADE LARGER, LIGHTER
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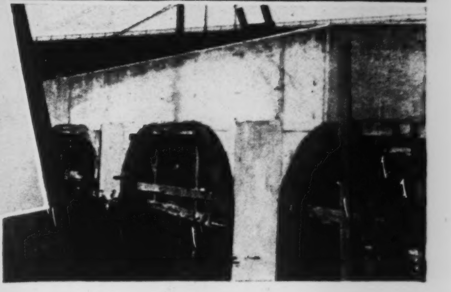
STRONGER



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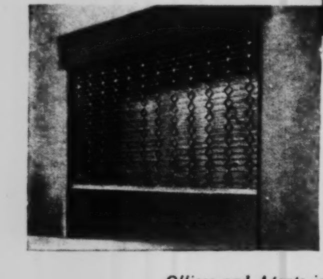
Left: Electricity operated Kinnear Rolling Doors can be opened or closed by the touch of a button at any one of a number of conveniently located control stations. Think of the places this would improve service and save time.

Right: Kinnear RoL-TOP sectional doors are made of either wood or steel. Durable upward-action combined with arrangements for light sections. Motor control if desired.



Left: The Kinnear Rolling Grille provides protections for gateways, corridors, etc. They operate with the convenience of a window shade and afford the advantages of air, light and vision. Made of various metals and in any size. Write for catalog.

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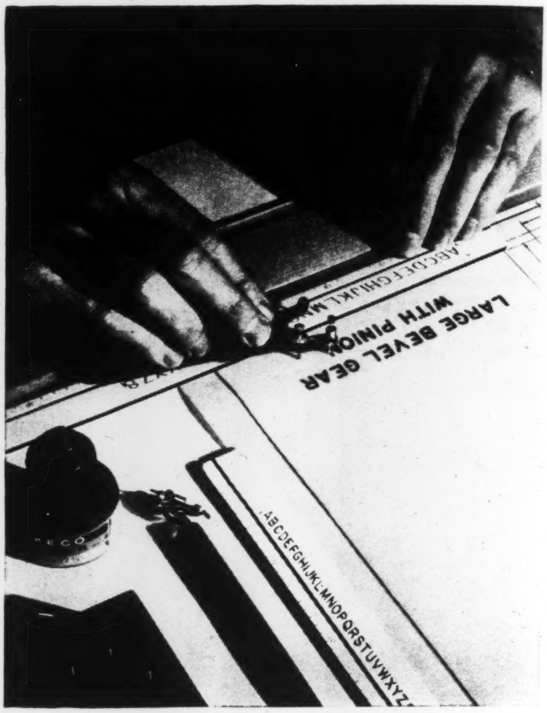

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(Above) An I-R wagon drill used in conjunction with an I-R two-stage portable air-cooled compressor on a road building job.

bove) Ingersoll-Rand Jack-
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e use of Jackbits reduces
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Roadbuilders and construction engineers know that they can rely on Ingersoll-Rand rock drilling equipment. Our nearest representative will be glad to assist you when in need of the following:

AIR COMPRESSORS:

Air-cooled Portable units in six sizes, from 55 to 315 cu. ft. per minute actual air delivery; oil-engine, petrol-engine or electric motor drive; any of the recognized standard mountings. A larger engine driven unit delivering 425 cu. ft. per minute is also available.

I-R Stationary compressors are built in over 1000 types and sizes, one to fit virtually any set of conditions.

JACKHAMER ROCKDRILLS:

A complete line of fast drilling easy handling drills that feature low air consumption and economical operation, used on road jobs throughout the world. It will pay you to investigate the famous "JA" family of Jackhamers.

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Outstanding is the popular "Wagon drill," which operates in any position. It is the answer to many a road building problem.

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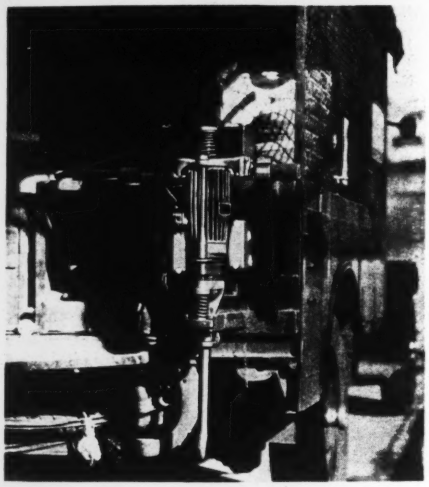

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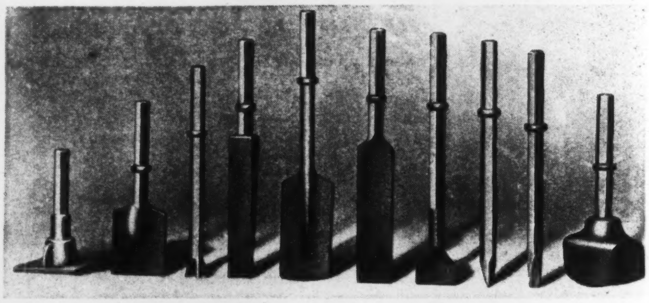

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TRIPLE LABOR EFFICIENCY
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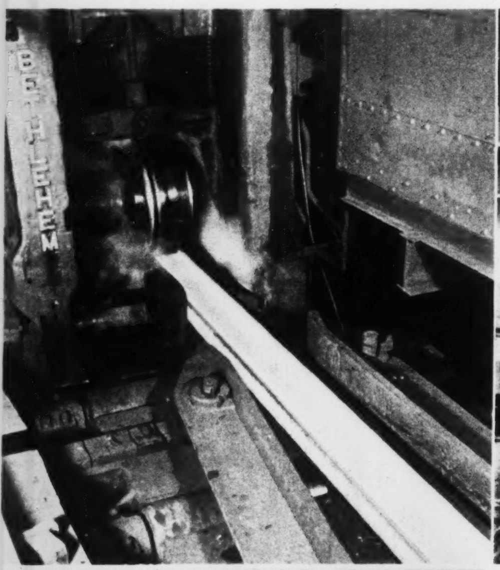

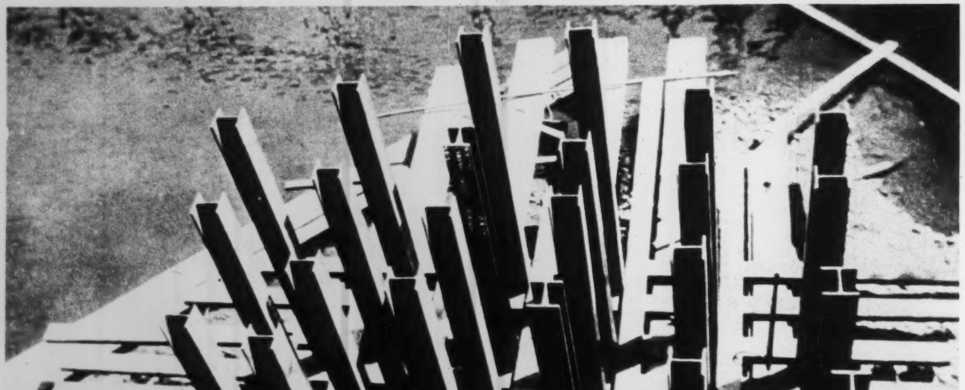

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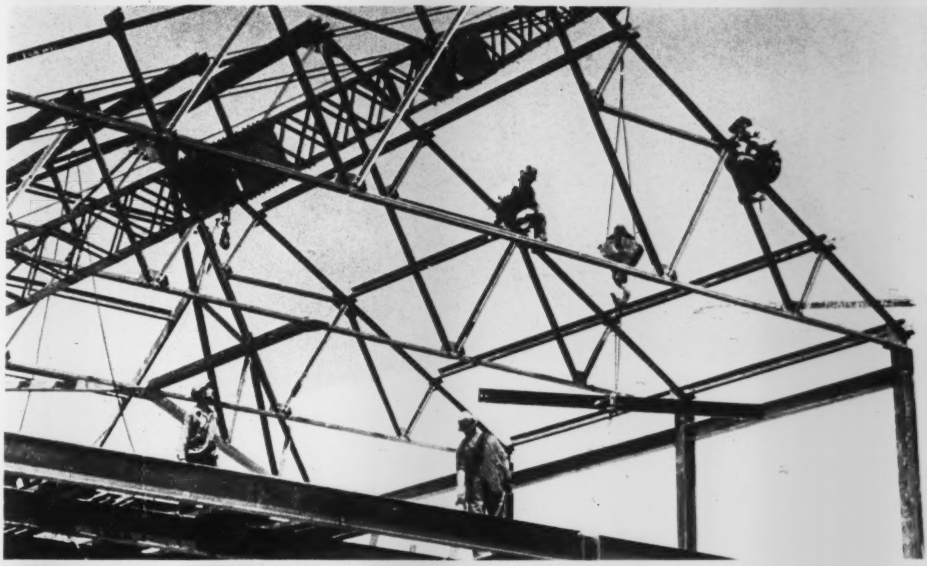
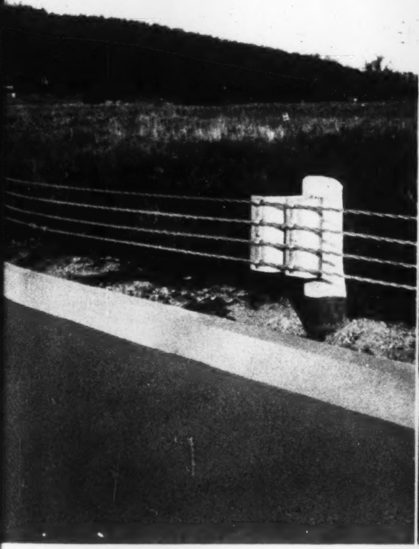
Steel work goes up in a hurry when Bethlehem handles the job. Steel-making divisions are completely coordinated with the construction division and swing into action quickly to supply the materials required, a set-up which is unique in the steel construction field. As completely equipped fabricating shops are maintained throughout the country, work on any project, regardless of its location, gets under way in the minimum of time.





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Bethanized fence, with its electrically applied, uniformly heavy coating of 99.99-per-cent-pure zinc has won the approval of highway departments throughout the country. It is of the tried-and-proved cut-stay, hinge-joint construction, which permits it to snap back into position after being deformed by pressure.

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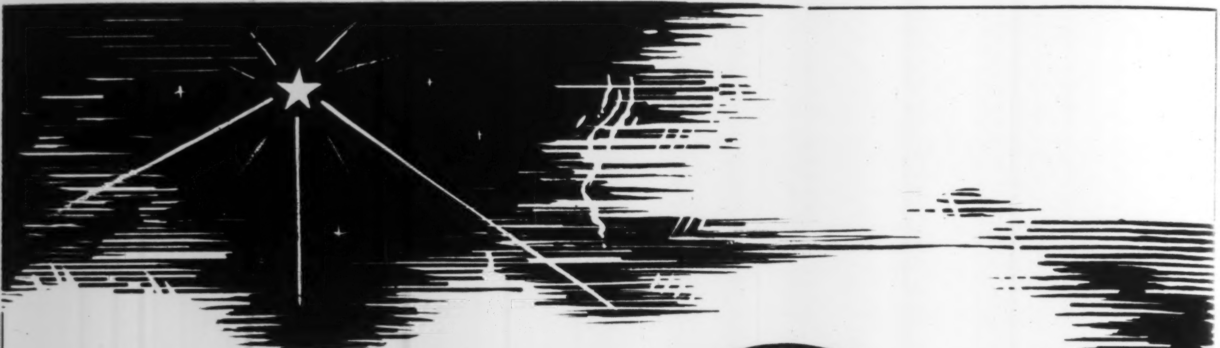
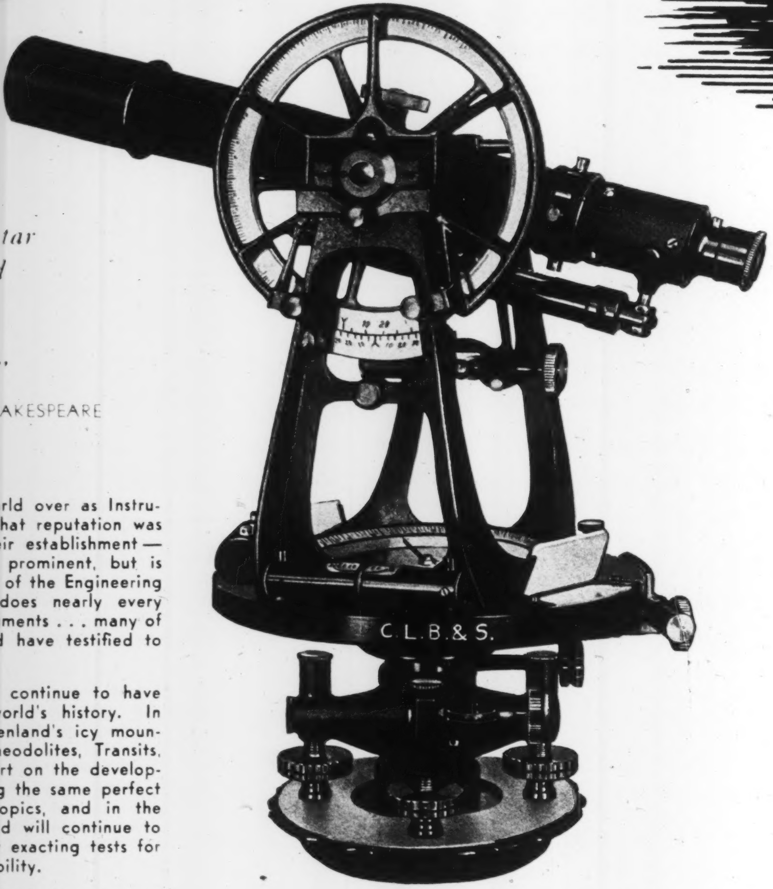
Bolts, Nuts, Rivets

Steel Plates

BETHLEHEM STEEL COMPANY





"I am as constant
. . . . as the northern star
Of whose true fixed and
. . . . resting quality
There is no fellow
. . . . in the firmament"

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Also truck mounted
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THE FIRST COST of a pipeline does not usually represent the true TOTAL COST because:

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BUT—Available tests and records show that in LOCK JOINT REINFORCED CONCRETE pipelines:

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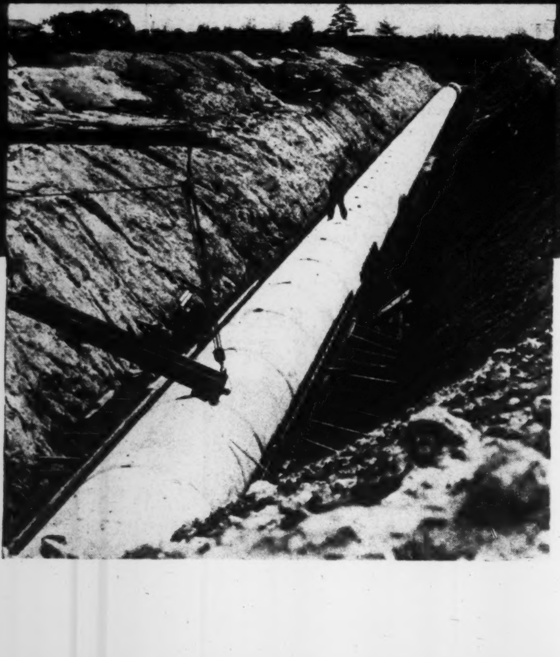LOCK JOINT Reinforced CONCRETE PRESSURE PIPE